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## **NIOSH HEALTH HAZARD EVALUATION REPORT:**

**HETA #2003-0094-2919**

**Utah Department of Public Safety**

**Utah Highway Patrol**

**Salt Lake City, Utah**

**November 2003**

## PREFACE

The Hazard Evaluations and Technical Assistance Branch (HETAB) of the National Institute for Occupational Safety and Health (NIOSH) conducts field investigations of possible health hazards in the workplace. These investigations are conducted under the authority of Section 20(a)(6) of the Occupational Safety and Health (OSHA) Act of 1970, 29 U.S.C. 669(a)(6) which authorizes the Secretary of Health and Human Services, following a written request from any employer or authorized representative of employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

HETAB also provides, upon request, technical and consultative assistance to federal, state, and local agencies; labor; industry; and other groups or individuals to control occupational health hazards and to prevent related trauma and disease. Mention of company names or products does not constitute endorsement by NIOSH.

## ACKNOWLEDGMENTS AND AVAILABILITY OF REPORT

This report was prepared by Randy L. Tubbs of HETAB, Division of Surveillance, Hazard Evaluations and Field Studies (DSHEFS). Field assistance was provided by Chad H. Dowell, M.S., HETAB. Desktop publishing was performed by Shawna Watts. Review and preparation for printing were performed by Penny Arthur.

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## Highlights of the NIOSH Health Hazard Evaluation

### Evaluation of Noise Exposure for the Utah Highway Patrol (UHP)

NIOSH investigators were asked to evaluate noise exposures that Utah Highway Patrol troopers are exposed to at work by the Commissioner of the Utah Department of Public Safety. The Department was aware of troopers with job-related hearing loss and of hearing loss claims submitted to Risk Management.

#### What NIOSH Did

- We measured daily noise exposures on troopers from six counties around Salt Lake City.
- We measured background noise on the freeway.
- Two NIOSH investigators rode with troopers writing down activities and the times that they happened.
- We reviewed the troopers' daily reports and the video tapes from the shifts they wore noise meters.

#### What NIOSH Found

- Noise exposures were below the OSHA permissible exposure limits.
- Noise associated with certain activities was found to be excessive.

#### What UHP Managers Can Do

- Begin an ongoing hearing conservation program for troopers.
- Issue earplugs plus ear muffs for troopers when they are on a firing range.
- Research the use of different radio earpieces and hearing protection devices.

#### What the UHP Employees Can Do

- Report concerns about noise levels through your chain of command.
- Participate in field evaluations of different hearing protection devices .



**What To Do For More Information:**  
We encourage you to read the full report. If you would like a copy, either ask your health and safety representative to make you a copy or call 1-513-841-4252 and ask for HETA Report #2003-0094-2919



**Health Hazard Evaluation Report 2003-0094-2919**  
**Utah Department of Public Safety - Utah Highway Patrol**  
**Salt Lake City, Utah**  
**November 2003**

**Randy L. Tubbs, Ph.D.**

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## SUMMARY

On December 4, 2002, the National Institute for Occupational Safety and Health (NIOSH) received a telephone call from an employee of the Utah Department of Public Safety who expressed a concern for troopers in the Utah Highway Patrol (UHP) being exposed to excessive levels of occupational noise that may impact their hearing. The telephone call led to a formal health hazard evaluation (HHE) request from the Commissioner of the Department of Public Safety. An opening conference was held in Salt Lake City, Utah, on December 16, 2002, with representatives of the troopers, the UHP, and researchers from Utah State University to discuss the logistics of a noise evaluation of the UHP troopers. The noise survey was conducted on March 11-14, 2003.

Full-shift noise dosimeter measurements were collected from troopers representing six different counties around Salt Lake City over three days. Each shift, two of the troopers were paired with a NIOSH investigator who rode with the troopers and filled in an activity log to match with the timestamp on the noise dosimeters. The UHP headquarters furnished copies of the troopers' in-car video tapes recorded during the survey period. Ambient noise samples were stored on a real-time analyzer to capture the noise spectra for the different highway conditions in which the troopers worked.

Fifty-three full-shift dosimeter samples were collected during the evaluation. The daily noise levels were all well below the Occupational Safety and Health Administration's permissible exposure limit (90 decibels on an A-weighted scale [dBA]) and action level (85 dBA). However, the potential for high noise exposures is evident in the median values of the maximum levels captured over the three survey days, which ranged up to 126.5 dBA. The noise spectra collected along the side of the highways at four locations (an accident scene, open highway, in the median, and on a berm on the freeway) were measured at 78.9, 83.8, 88.4, and 88.0 dBA, respectively.

Because of the potential for hazardous noise that UHP troopers may encounter during their employment, the NIOSH investigators offer recommendations to the Department of Public Safety that would reduce the risk of occupational hearing loss. The recommendations include an ongoing hearing conservation program and hearing protection use on firing ranges. An additional recommendation is offered on the use of devices to improve the troopers' communication abilities while on duty.

Keywords: SIC 9221 (Police Protection), highway patrol, noise, dosimeter, communication, hearing conservation program, hearing protection devices

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## INTRODUCTION

On December 4, 2002, the National Institute for Occupational Safety and Health (NIOSH) received a telephone call from an employee of the Utah Department of Public Safety who expressed a concern for troopers in the Utah Highway Patrol (UHP) being exposed to excessive levels of occupational noise that may impact their hearing. This telephone conversation was followed by a letter from the Commissioner of the Department of Public Safety formally requesting that a health hazard evaluation (HHE) be conducted at the UHP. In the letter, it was stated that troopers are exposed to hazardous levels of noise as they issue citations to drivers on highways and freeways. It was believed that over time troopers may suffer a hearing loss which could also be a safety issue since their job activities require critical communications in adverse listening conditions. Because of the relative lack of control over the troopers' noise environment, the HHE request focused on assessing the need for hearing protection devices by the troopers.

On December 16, 2002, an opening conference was held at the UHP headquarters in Salt Lake City. UHP management representatives, a Patrol Association employee representative, researchers from Utah State University, and a NIOSH investigator met to discuss the evaluation and the logistical problems associated with the project. It was mutually decided at this meeting to have troopers wear noise dosimeters during their work shift over three consecutive days to capture the noise levels in a real-time mode. The minute-by-minute noise levels could then be compared to information on specific activities obtained from video tapes from each trooper's vehicle and to the accompanying NIOSH investigator's log sheet for the vehicles selected for a ride-around. Additional noise spectra would be collected with a real-time noise analyzer at locations on the highways where troopers were conducting their business. The noise survey was conducted on March 11 - 14, 2003.

## BACKGROUND

The UHP is administratively housed in the Department of Public Safety, with its headquarters in Salt Lake City, Utah. It has a mission "to provide professional police and traffic services, and to protect the constitutional rights of all people in Utah." It provides these services with a staff of more than 420 employees, most of whom are sworn officers of the State. The state is divided into twelve field sections with 15 to 70 troopers assigned to each of the sections, depending on the field section's need.<sup>1</sup> Troopers are assigned personal vehicles that are taken home with them at the end of their shift. Troopers' vehicles are equipped with a radio, wireless laptop computer and printer, and a video camera. Troopers also carry a cellular telephone for an additional communication line.

The UHP administration was aware of anecdotal information that troopers were suffering from noise-induced hearing loss. There have also been workers' compensation claims forwarded to the Risk Management office for determination of the job-relatedness of troopers' hearing loss. Current policy of the UHP is to test the auditory ability of potential hires, but no further hearing testing is conducted during the trooper's career.

## METHODS

At the opening conference held on the day before noise sampling was to begin, troopers representing six counties around the Salt Lake City headquarters of the UHP were in attendance. They informed the NIOSH investigators that they all worked from their homes using the UHP patrol car that is assigned to them. Their work shifts were 8 - 12 hours in length and began as early as 5:00 a.m. and as late as 7:00 p.m. Because of the beginning times of work shifts and the distances from headquarters, it was decided to preset the noise dosimeters to turn on at a specified time and remain on for a specified time with the dosimeters' computer software. The dosimeters were shuttled by troopers to a central location in each county and returned each day to headquarters so that the data could be downloaded into a computer, cleared, and reset for the next day's

work shift before being shuttled back to the central county location.

Quest® Electronics Model Q-300 Noise Dosimeters were used to collect the daily noise exposure measurements from the UHP troopers that had volunteered to be in the NIOSH evaluation. Because of the large geographical work area of the troopers and their variable work schedules, the dosimeters were programmed to turn on and off at designated times with QuestSuite® Professional computer software prior to being picked up and distributed to the troopers. During the opening conference, the troopers were instructed on how to place the dosimeter on their work belts and attach the dosimeter's microphone to the epaulets on their uniform shirt, halfway between the collar and the point of their shoulder. A windscreen provided by the manufacturer of the dosimeter was placed over the microphone during recordings. The dosimeters were worn by the troopers for their entire work shift or until they were picked up for delivery to UHP headquarters. The noise information was downloaded to a personal computer for interpretation with Quest computer software and the dosimeters reset to automatically start and stop on the next day. The dosimeters were calibrated before and after the work shift according to the manufacturer's instructions.

Real-time area noise sampling of highway traffic noise was performed with a Larson-Davis Laboratory Model 2800 Real-Time Analyzer and a Larson-Davis Laboratory Model 2559 ½" random incidence response microphone. The analyzer allows for the analysis of noise into its spectral components in a real-time mode. The ½" diameter microphone has a frequency response range ( $\pm 2$  decibels [dB]) from 4 Hertz (Hz) to 21 kilohertz (kHz) that allows for the analysis of sounds in the region of concern. One-third octave bands consisting of center frequencies from 25 Hz to 20 kHz were integrated for 30 seconds and stored in the analyzer.

The two NIOSH investigators rode separately with two UHP troopers for their entire work shift over the three days of the evaluation. During this time, the NIOSH investigator logged the trooper's activities

and the time that they occurred for comparison to the time recording on the noise dosimeter record. Each trooper's daily report generated from input into the wireless laptop computer and radio communications with the dispatch center was supplied to the NIOSH investigator. This report furnished times and associated activities of the trooper during their tour of duty. Additional trooper activities were captured with the patrol car's video camera system. These cameras are set to be activated whenever a trooper turns on the emergency warning lights and stays on until the trooper turns it off. There is a date and time stamp on the video record. Troopers wear a remote microphone that captures conversations between the trooper and the people around him or her.

## EVALUATION CRITERIA

As a guide to the evaluation of the hazards posed by workplace exposures, NIOSH field staff employ environmental evaluation criteria for the assessment of a number of chemical and physical agents. These criteria are intended to suggest levels of exposure to which most workers may be exposed up to 10 hours per day, 40 hours per week for a working lifetime without experiencing adverse health effects. It is, however, important to note that not all workers will be protected from adverse health effects even though their exposures are maintained below these levels. A small percentage may experience adverse health effects because of individual susceptibility, a pre-existing medical condition, and/or a hypersensitivity. In addition, some hazardous substances may act in combination with other workplace exposures, the general environment, or with medications or personal habits of the worker to produce health effects even if the occupational exposures are controlled at the level set by the criterion. These combined effects are often not considered in the evaluation criteria. Finally, evaluation criteria may change over the years as new information on the toxic effects of an agent become available.

The primary sources of environmental evaluation criteria for the workplace are: (1) NIOSH Recommended Exposure Limits (RELs),<sup>2</sup> (2) the

American Conference of Governmental Industrial Hygienists' (ACGIH®) Threshold Limit Values (TLVs®),<sup>3</sup> and (3) the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PELs).<sup>4</sup> Employers are encouraged to follow the OSHA limits, the NIOSH RELs, the ACGIH TLVs, or whichever are the more protective criteria.

OSHA requires an employer to furnish employees a place of employment that is free from recognized hazards that are causing or are likely to cause death or serious physical harm [Occupational Safety and Health Act of 1970, Public Law 91-596, sec. 5(a)(1)]. Thus, employers should understand that not all hazardous chemicals have specific OSHA exposure limits such as PELs and short-term exposure limits (STELs). An employer is still required by OSHA to protect their employees from hazards, even in the absence of a specific OSHA PEL.

## Noise

Noise-induced loss of hearing is an irreversible, sensorineural condition that progresses with exposure. Although hearing ability declines with age (presbycusis) in all populations, exposure to noise produces hearing loss greater than that resulting from the natural aging process. This noise-induced loss is caused by damage to nerve cells of the inner ear (cochlea) and, unlike some conductive hearing disorders, cannot be treated medically.<sup>5</sup> While loss of hearing may result from a single exposure to a very brief impulse noise or explosion, such traumatic losses are rare. In most cases, noise-induced hearing loss is insidious. Typically, it begins to develop at 4000 or 6000 Hz (the hearing range is 20 Hz to 20000 Hz) and spreads to lower and higher frequencies. Often, material impairment has occurred before the condition is clearly recognized. Such impairment is usually severe enough to permanently affect a person's ability to hear and understand speech under everyday conditions. Although the primary frequencies of human speech range from 200 Hz to 2000 Hz, research has shown that the consonant sounds, which enable people to

distinguish words such as "fish" from "fist," have still higher frequency components.<sup>6</sup>

The A-weighted decibel [dB(A)] is the preferred unit for measuring sound levels to assess worker noise exposures. The dB(A) scale is weighted to approximate the sensory response of the human ear to sound frequencies near the threshold of hearing. The decibel unit is dimensionless, and represents the logarithmic relationship of the measured sound pressure level to an arbitrary reference sound pressure (20 micropascals, the normal threshold of human hearing at a frequency of 1000 Hz). Decibel units are used because of the very large range of sound pressure levels which are audible to the human ear. Because the dBA scale is logarithmic, increases of 3 dBA, 10 dBA, and 20 dBA represent a doubling, tenfold increase, and 100-fold increase of sound energy, respectively. It should be noted that noise exposures expressed in decibels cannot be averaged by taking the simple arithmetic mean. A time-weighted average (TWA) exposure refers to the average noise exposure during a normal 8-hour workday.

The OSHA standard for occupational exposure to noise (29 CFR 1910.95)<sup>7</sup> specifies a maximum PEL of 90 dBA for a duration of 8 hours per day. The regulation, in calculating the PEL, uses a 5 dB time/intensity trading relationship, or exchange rate. This means that a person may be exposed to noise levels of 95 dBA for no more than 4 hours, to 100 dBA for 2 hours, etc. Conversely, up to 16 hours exposure to 85 dBA is allowed by this exchange rate. The duration and sound level intensities can be combined in order to calculate a worker's daily noise dose according to the formula:

$$\text{Dose} = 100 \times (C_1/T_1 + C_2/T_2 + \dots + C_n/T_n),$$

where  $C_n$  indicates the total time of exposure at a specific noise level and  $T_n$  indicates the reference duration for that level as given in Table G-16a of the OSHA noise regulation. During any 24-hour period, a worker is allowed up to 100% of his daily noise dose. Doses greater than 100% are in excess of the OSHA PEL.

The OSHA regulation has an additional action level (AL) of 85 dBA; an employer shall administer a continuing, effective hearing conservation program when the 8-hour TWA value exceeds the AL. The program must include monitoring, employee notification, observation, audiometric testing, hearing protectors, training, and record keeping. All of these requirements are included in 29 CFR 1910.95, paragraphs (c) through (o). Finally, the OSHA noise standard states that when workers are exposed to noise levels in excess of the OSHA PEL of 90 dBA, feasible engineering or administrative controls shall be implemented to reduce the workers' exposure levels.

NIOSH, in its Criteria for a Recommended Standard,<sup>8</sup> and the ACGIH<sup>3</sup> propose exposure criteria of 85 dBA as a TWA for 8 hours, 5 dB less than the OSHA standard. The criteria also use a more conservative 3 dB time/intensity trading relationship in calculating exposure limits. Thus, a worker can be exposed to 85 dBA for 8 hours, but to no more than 88 dBA for 4 hours or 91 dBA for 2 hours. Twelve hours exposures have to be 83 dBA or less according to the NIOSH REL. Like the PEL, a worker is allowed a daily noise dose of up to 100% during a 24-hour period under these criteria.

## RESULTS

A total of 53 full-shift dosimeter samples were collected during the evaluation. The Quest dosimeters collect data so that one can directly compare the information with the three different noise criteria used in this survey, the OSHA PEL and AL, and the NIOSH REL. The OSHA criteria use a 90 dBA criterion and 5-dB exchange rate for both the PEL and AL. The difference between the two is the threshold level employed, with a 90 dBA threshold for the PEL and an 80 dBA threshold for the AL. The threshold level is the lower limit of noise values included in the calculation of the criteria; values less than the threshold are ignored by the dosimeter. The NIOSH criterion differs from OSHA in that the criterion is 85 dBA, the threshold is 80 dBA, and it uses a 3-dB exchange rate. Because of the different

8-hr criteria and exchange rates, the dose equations used to calculate the equivalent TWA values are different for the NIOSH and OSHA criteria. The OSHA dose equation is:

$$\text{TWA} = 16.61 \times \log_{10} (\text{Dose}/100) + 90,$$

and the NIOSH equation is:

$$\text{TWA} = 10.00 \times \log_{10} (\text{Dose}/100) + 85.$$

A summary of the dosimeter results is presented in Table 1. Arithmetic mean and standard deviation values were calculated for the dosimeter run time and the three dose values. Because the dBA scale is logarithmic in nature, a median and range were calculated for the maximum dBA, slow-response level that was recorded during the sampling period. Also, the equivalent TWA values were calculated using the mean dose value and the appropriate equation.

The sampled daily noise levels are all well below the OSHA PEL and AL. The noise values collected according to the NIOSH criterion were higher because of the more conservative formula, but were on the average less than the REL. However, in four out of 53 instances the individual daily noise dose exceeded 100% of allowable, and in three additional instances the daily dose was greater than 90%. The potential for high noise exposures is evident in the median value of the maximum levels captured over the three survey days, which ranged up to 126.5 dBA.

The output from the dosimeters also captures the minute-by-minute, real-time noise exposure over the sampling period. Each data point represents the integrated average noise for a 1-min period (using the NIOSH 3 dB exchange rate). Graphs for each of the troopers sampled during the evaluation are presented in Figures 1-53. Included on each graph is the trooper's daily report which documents the time each activity occurred. It should be noted that the graphs have a lower limit of 70 dBA which is the lowest noise value the dosimeters captured in the mode ("High") to which they were set. The vast majority of the figures show that the troopers' noise

exposures are less than 85 dBA, with only a few periods greater than this level. There is no clear relationship between particular trooper activities and the associated noise exposures. This was evident in the trooper's daily reports and in the video tapes that were viewed.

Spectral noise data were collected during the evaluation in various locations patrolled by the UHP. Thirty-second samples were captured at the following locations: an accident scene on the freeway where traffic was moving very slowly; an open, flat area of the freeway near an exit ramp during a traffic stop where traffic was moving at the speed limit; the median of a section of freeway next to a 3-ft. concrete wall separating the two directions of traffic moving at the speed limit; and the freeway berm next to a 10-ft. sound wall with traffic moving at the speed limit. The frequency-intensity data from all four locations are shown in Figure 54. The figure shows that standing next to the concrete walls with traffic moving at or above the speed limit resulted in the highest noise levels. For the four locations (an accident scene and open, median, and berm freeway), the measured dBA levels were 78.9, 83.8, 88.4, and 88.0 dBA, respectively. The figures also show that much of the sound energy is in the lower frequency (less than 315 Hz) range. This is exemplified in the unweighted sound levels which are 88.1, 87.3, 101.8, and 99.0 dB sound pressure level (SPL) respectively, for the four highway locations noted above.

## DISCUSSION

The dosimeter results from this evaluation did not indicate noise over-exposures for the troopers of the UHP. In no instance did the sampling results exceed the OSHA permitted levels or the levels where hearing conservation programs must be initiated. The mean daily noise doses calculated according to the NIOSH criterion over the three survey days were less than 60% of the allowable level. There were a few instances where individual troopers did exceed

their daily allowable dose when compared to the NIOSH criterion. Closer inspection of the dosimeter data show that the potential for high levels of noise exists in this population. The individual noise exposure data seen in the figures have 1-minute periods that are greater than 90 dBA and the maximum dBA slow-response level captured by the dosimeters ranged as high as 126 dBA. Law enforcement officers have an additional high noise exposure potential from firing ranges that was not addressed in this HHE. Officers must qualify the weapons they use on a routine basis which exposes them to very high levels of noise.<sup>9,10</sup>

During the initial discussions involving this evaluation, it was believed that the daily TWA noise levels of the troopers might not represent the true noise burden of this population. It was understood that it is very difficult to define a normal day's activities for a trooper. Much of their work is dictated by what happens on the highways. The troopers' vehicles are designed to provide a quieter interior for the occupants. If a trooper were to spend most of his or her day patrolling their area with no activities that take them from their vehicle, it would be expected that their noise exposures would be low. However, if a trooper were to spend a large portion of their day outside of their vehicle on the highway during traffic stops, public assists, and accident investigations, it was believed that their noise exposures would be substantially higher. Based on these assumptions, it was decided to try and document the troopers' daily activities and compare them to the noise that was captured by the dosimeters. Direct observation of each trooper would be one way to accomplish this documentation, but it was impossible to assign a NIOSH investigator to each of the 17-19 troopers surveyed each day or to extend the survey days to allow the two NIOSH investigators to ride with all of the surveyed troopers over several days. The use of the trooper's daily report, which covers all reported activities during the work shift, and tapes from the vehicle's video camera that was activated at certain times during the trooper's tour of duty were substituted for the direct observation of a trooper. Analysis of these data would allow for the association of high and low

noise periods with particular activities, such as vehicle stops, traffic control, or break periods.

The trooper's daily report was entered onto a spreadsheet that already had the one-minute time periods and associated noise exposure levels captured by the dosimeter. If there was a video record for the trooper or a NIOSH investigator's log, these were also entered into the spreadsheet database. There was some difficulty in copying the video records for many of the troopers. The tapes were missing time/date stamps in some instances or were unable to be viewed in other cases. No useable information was obtained from these video records. For those instances where the tapes had information, the synchronization of the camera's, dosimeter's, and dispatcher's clocks was not possible. Thus, it was not always possible to accurately associate a particular trooper's activity with a particular noise level captured with the dosimeter. During the analysis of the video tapes, it was possible to see a change in the one-minute noise exposure levels near the time the activity took place, but it was not always within a consistent time frame. The daily reports also did not contain enough information, such as when the trooper entered and exited their vehicle, to be used for this purpose. However, there were general trends observed with these data. When troopers were out of their vehicles on the freeways, the noise exposure levels seemed to increase. Examples of this are seen in Figure 2 when the trooper was on traffic control, in Figure 38 from 1:07 - 3:06 a.m. when the trooper was involved in an arrest where the suspects were resisting rather vigorously, or in Figure 53 when the trooper is at an accident scene from 10:35 - 11:06 p.m. This finding of increased noise exposure for troopers out of their vehicles is reinforced by the spectral noise data obtained near Salt Lake City on freeways that have median and berm concrete walls (Figure 54). Noise measured in these locations was 88 dBA for the two situations. At these levels, a trooper could stand along the freeway for only four hours before their allowable daily noise dose of 100% was fulfilled according to the NIOSH criterion. Finally, there were anecdotal observations made on some of the video tapes during the analysis that point out the poor communication conditions in which the troopers

operate. There were several instances where the trooper was heard on the remote microphone to ask the driver to repeat what they had just said. Also, troopers sometimes leaned into the open window of the vehicle they had stopped to better hear the occupants. This was prevalent when troopers went to the passenger side of the stopped vehicle to get them away from the freeway traffic.

## CONCLUSIONS

The noise dosimeter data showed that UHP troopers were not exposed to hazardous noise according to the OSHA noise regulation. There were, however, indications that the potential for higher exposures exists for this work force. The maximum levels recorded throughout the day ranged as high as 126 dBA; the highway noise was measured at 88 dBA outside of the trooper's vehicle; the NIOSH REL was exceeded in a few instances, and there are other trooper activities that were not measured in this evaluation but have been found to have high noise exposures, such as weapons training. Additionally, there were examples seen in this survey that showed a trooper's ability to engage in communications was compromised.

Similar findings of noise exposures less than the OSHA PEL have been reported for another public safety group, the fire service.<sup>11,12,13</sup> Dosimeter studies conducted at fire departments consistently revealed noise exposures that were less than 100% of the fire fighters' allowable daily noise dose, even for 24-hour work shifts. Surprisingly, when the hearing abilities of these employees were checked, there appears to be a relationship between time in service and the amount of hearing loss exhibited by the fire fighters.<sup>14,15</sup> These studies found occupational high-frequency hearing loss on the order of 25-45 dB after a 30-year career in the fire service after the data were corrected for hearing loss due to aging.

There are only a few references in the scientific literature to hearing loss in law enforcement. Pierson and Hahe found that a small sample of highway patrol officers had more hearing loss than a group of control subjects.<sup>16</sup> Another study of 55 male police

officers from different departments found that the young officers had essentially normal hearing, but the older officers showed greater high-frequency hearing loss with increasing age. The hearing loss in the officer group overall was greater than a normative population of age-matched individuals.<sup>17</sup> This limited research into hearing risks from law enforcement activities may be reflected in the hiring qualifications for new officers. A cursory review of employment standards for law enforcement officers finds states which have no reference to hearing,<sup>18</sup> states which require “normal” hearing with no performance standards,<sup>19</sup> states which require passing a whisper test,<sup>20</sup> and states with specific hearing performance standards.<sup>21</sup> The State of Michigan incorporated their performance standards into Administrative Law in 1995, including a recommendation for police agencies to establish an ongoing hearing conservation program.<sup>21</sup>

The California Commission on Police Officer Standards and Training (POST) has also published hearing guidelines in their medical screening requirements for new candidates that address the problems of speech recognition in noise environments through the use of the hearing in noise test (HINT).<sup>22,23</sup> It is believed that this test, and others like it, may better evaluate an officer’s ability to perform auditorily in real-life situations, such as hearing drivers when they are pulled over on busy freeways or understanding radio communications when the background noise levels are high.

## RECOMMENDATIONS

Based on the findings of this evaluation and on other research published on law enforcement officers’ noise exposures and risk of hearing loss, the following recommendations are offered to better protect the hearing of the UHP troopers and to improve their working conditions.

1. The UHP should establish an ongoing hearing conservation program for all of their troopers. Even though the exposures captured by the dosimeters never exceeded the OSHA limits for noise during this evaluation, there were indications of the

potential for high levels of occupational noise that may increase troopers risk of hearing loss. The basic elements of the program should, at a minimum, meet the requirements of the OSHA hearing conservation amendment (29 CFR 1910.95).<sup>7</sup> Other sources for defining effective hearing conservation programs are also available.<sup>21,24,25,26</sup>

2. Even though weapon training was not a part of this evaluation, other studies have shown that the use of double hearing protection (ear muffs over ear plugs) is warranted during weapons training exercises. The peak noise levels emitted by the weapons and the amount of attenuation given by hearing protection devices are such that double protection will offer maximum protection to the troopers’ hearing and also give some insurance against improper fitting of the devices or incompatibility with other personal protective equipment, such as safety glasses.<sup>9</sup>

3. Communication difficulties were noted between the troopers and the public during some of the traffic stops on the freeway. Since there is no way to reduce the ambient noise levels from traffic, the UHP should begin to research different techniques to improve the troopers’ signal-to-noise ratios through different radio speakers and hearing protection. The signal from the trooper’s radio can be improved by the use of earpiece connectors that deliver the radio signal directly to the trooper’s ear canal. However, care must be taken to insure that the radio signal never reaches hazardous levels. There are devices on the market (e.g., Peltor® Communications) that are designed for 2-way radio users who need clear reception of incoming transmissions while working in noisy environments. The unit’s transducer limits volume spikes to 85 dBA and the signal passes through an acoustic tube threaded through an earplug which offers noise reduction ratings (NNR) of up to 29 dBA. If troopers feel that they need additional attenuation of highway noise through their open ear, then moderate attenuation, flat response hearing protectors can be used. These devices are sometimes advertised as “musician’s earplugs.” The UHP might want to solicit volunteers who would try these devices during their patrols to see if they are

compatible with their activities, reduce noise exposure, and yet improve communication.

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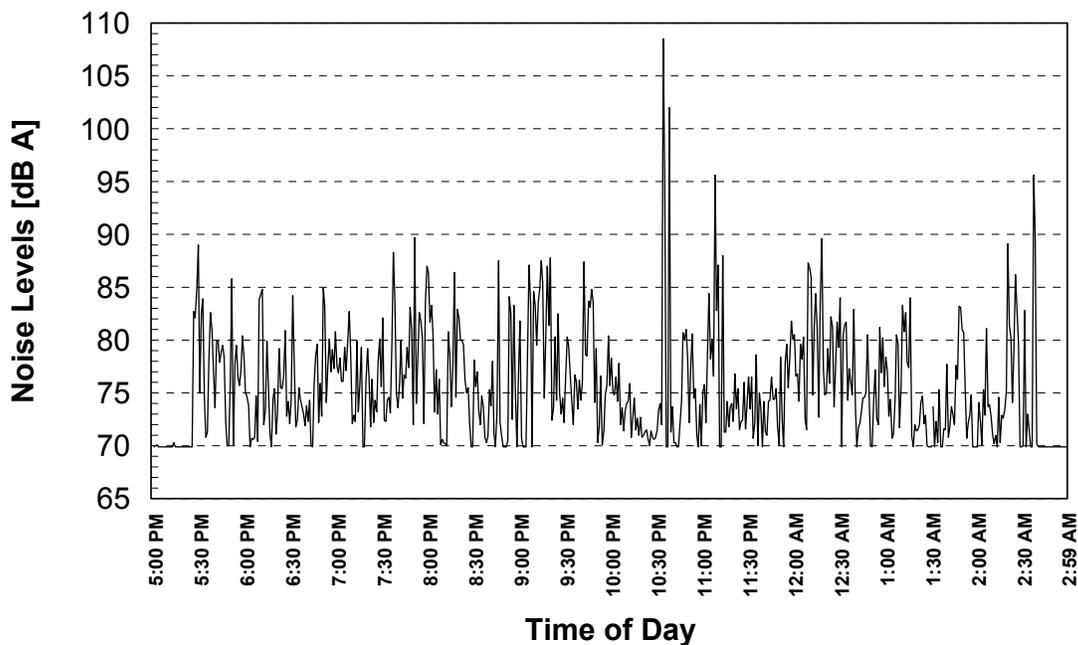
**Table 1**  
**Noise Dosimeter Summary Results**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 11 - 13, 2003**

<b>March 11, 2003</b>					
N = 17	Run Time	Maximum Level	AL - Dose	PEL - Dose	REL - Dose
Mean	564.9 min		8.94 %	3.02 %	41.76 %
Median		107.5 dBA			
Stand. Dev.	71.45 min		4.18 %	1.19 %	27.14 %
Range		102.4 - 124.4 dBA			
Calculated TWA			72.58 dBA	64.75 dBA	81.21 dBA

<b>March 12, 2003</b>					
N = 19	Run Time	Maximum Level	AL - Dose	PEL - Dose	REL - Dose
Mean	566.4 min		10.46 %	4.29 %	55.77 %
Median		112.8 dBA			
Stand. Dev.	74.89 min		7.16 %	4.31 %	52.95 %
Range		102.3 - 126.5 dBA			
Calculated TWA			73.72 dBA	67.28 dBA	82.46 dBA

<b>March 13, 2003</b>					
N = 18	Run Time	Maximum Level	AL - Dose	PEL - Dose	REL - Dose
Mean	582.8 min		10.99 %	4.08 %	43.81 %
Median		110.4 dBA			
Stand. Dev.	55.45 min		7.28 %	3.66 %	28.39 %
Range		101.7 - 116.8 dBA			
Calculated TWA			74.07 dBA	66.93 dBA	81.42 dBA

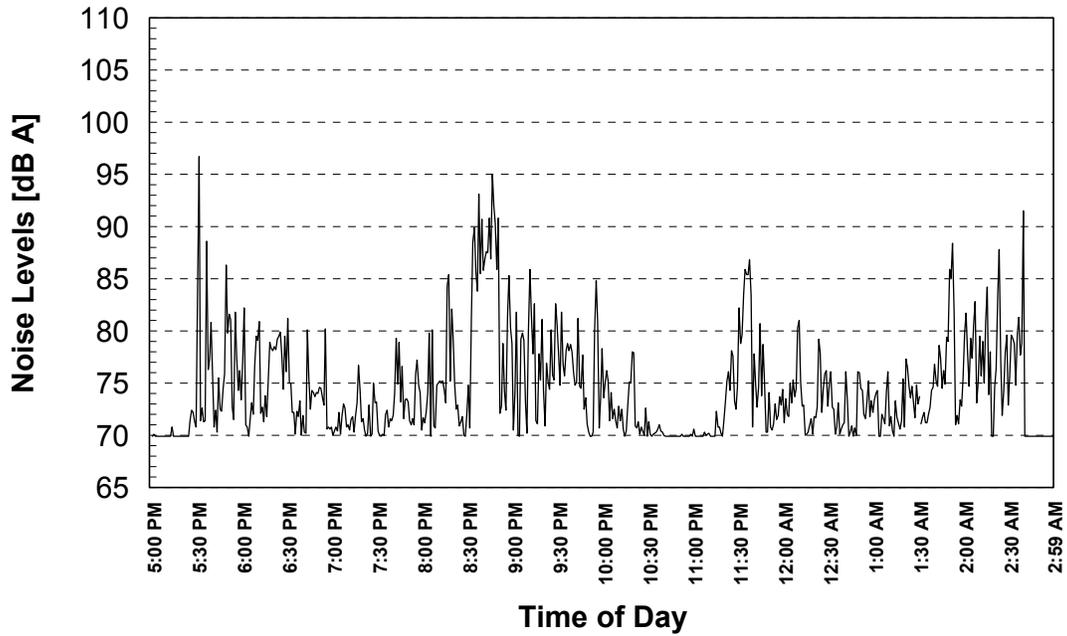
**Figure 1**  
**Noise Dosimeter Data: Trooper 288**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 11-12, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
5:00 - 7:30 pm	Patrol	9:47 - 10:07 pm	Patrol	12:26 - 12:47 am	Patrol
7:30 - 7:39 pm	Vehicle Stop	10:07 - 11:20 pm	Break	12:47 - 2:04 am	Physical Custody Arrest
7:39 - 8:24 pm	Patrol	11:20 p -12:21 a	Patrol	2:04 -2:56 am	Patrol
8:24 - 8:36 pm	Vehicle Stop	12:21 - 12:26 am	Vehicle Stop	2:56 am	Off-duty
8:36 - 9:47 pm	Traffic Control				

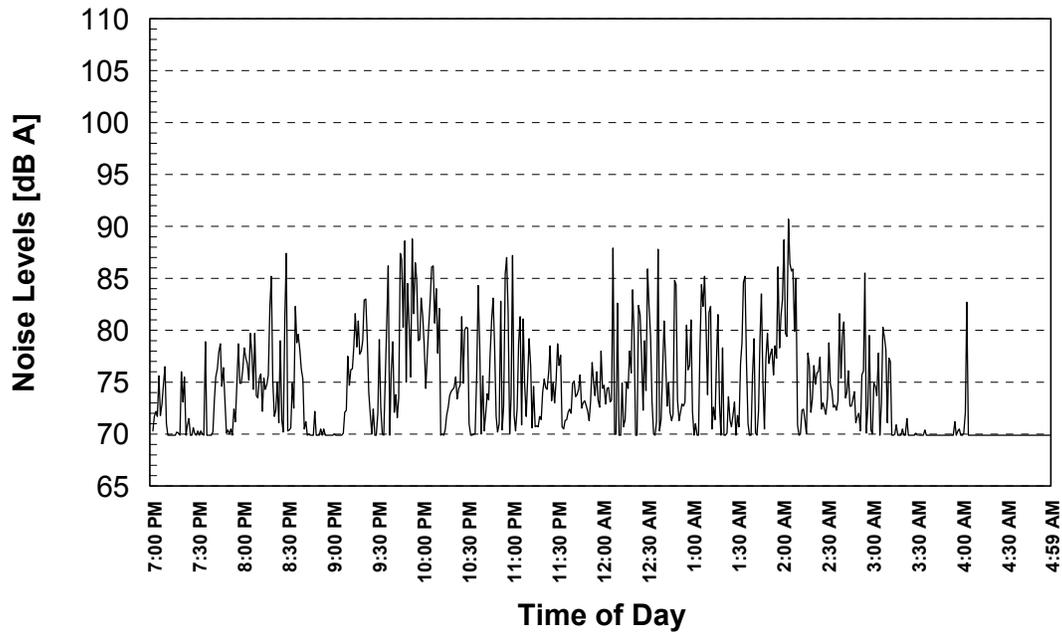
**Figure 2**  
**Noise Dosimeter Data: Trooper 320**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 11-12, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
5:30 pm	Dosimeter	9:48 - 9:54 pm	Patrol	1:20 - 2:00 am	Vehicle Fueling
5:54 - 6:30 pm	Patrol	9:54 - 9:59 pm	Vehicle Stop	2:00 - 2:09 am	Public Assist
6:30 - 6:41 pm	Vehicle Fueling	9:59 - 10:17 pm	Patrol	2:09 - 2:16 am	Patrol
6:41 - 7:22 pm	Patrol	10:17 - 11:22 pm	Break	2:16 - 2:24 am	Vehicle Stop
7:22 - 8:06 pm	Computer Maintenance	11:22 p - 12:21 a	Patrol	2:24 - 2:57 am	Patrol
8:06 - 8:15 pm	Patrol	12:21 - 1:08 am	Vehicle Stop	2:27 am	Off Duty
8:15 - 9:48 pm	Traffic Control	1:08 - 1:20 am	Patrol		

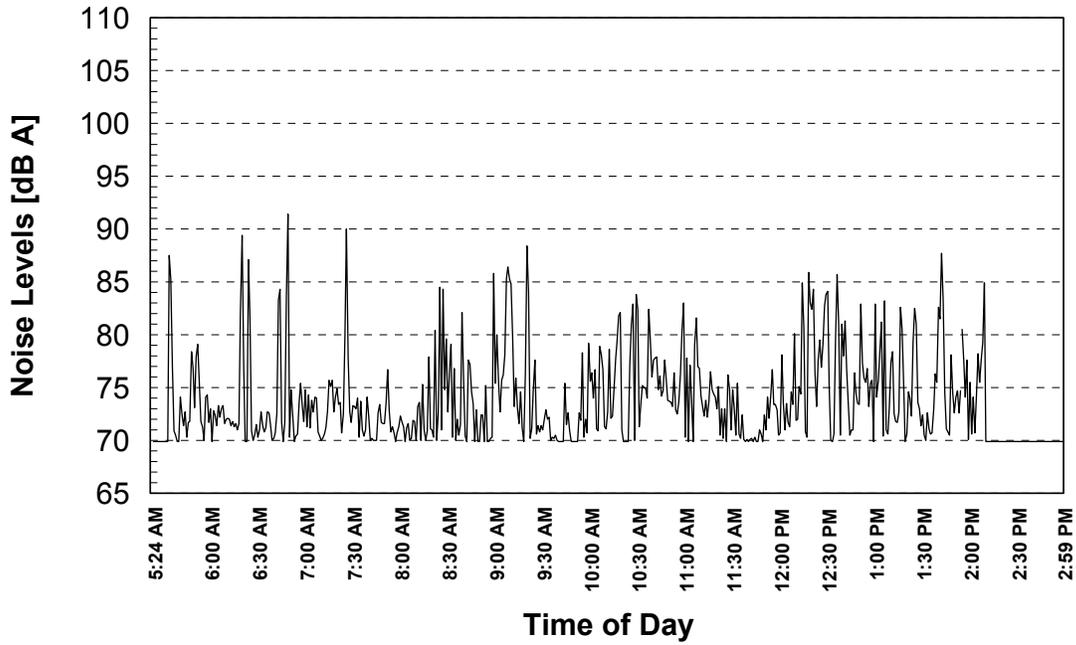
**Figure 3**  
**Noise Dosimeter Data: Trooper 273**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 11-12, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
7:00 - 7:23 pm	Patrol	11:01 - 11:09 pm	Patrol	1:21 - 1:33 am	Patrol
7:23 - 7:52 pm	Incident Report	11:09 - 11:14 pm	Vehicle Stop	1:33 - 2:10 am	Vehicle Stop
7:52 - 7:55 pm	Patrol	11:14 a - 12:09 p	Patrol	2:10 - 2:16 am	Patrol
7:55 - 8:44 pm	Criminal Investigation	12:09 - 12:21 am	Vehicle Fueling	2:16 - 2:56 am	Break
8:44 - 10:31 pm	Patrol	12:21 - 12:32 am	Patrol	2:56 - 3:09 am	Patrol
10:31 - 10:39 pm	Vehicle Stop	12:32 - 12:38 am	Vehicle Stop	3:09 - 3:13 am	Vehicle Stop
10:39 - 10:48 pm	Patrol	12:38 - 1:00 am	Patrol	3:13 - 3:29 am	Patrol
10:48 - 10:56 pm	Vehicle Stop	1:00 - 1:11 am	Vehicle Stop	3:29 - 4:26 am	Incident Report
10:56 - 10:59 pm	Patrol	1:11 - 1:18 am	Patrol	4:26 - 4:54 am	Patrol
10:59 - 11:01 pm	Vehicle Stop	1:18 - 1:21 am	Vehicle Stop	4:54 am	Off Duty

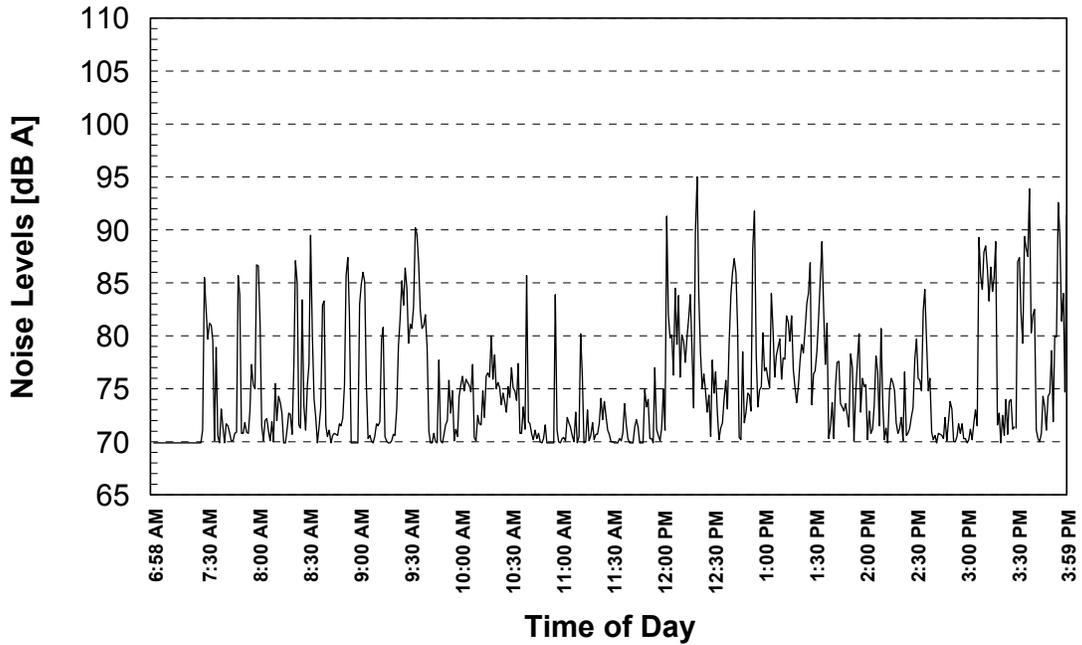
**Figure 4**  
**Noise Dosimeter Data: Trooper 341**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 11, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
5:33 am	Dosimeter On	8:13 - 8:26 am	Vehicle Fueling	12:02 - 12:10 pm	Public Assist
5:33 - 5:44 am	Public Assist	8:26 - 8:54 am	Patrol	12:10 - 12:26 pm	Patrol
5:44 - 5:55 am	Patrol	8:54 - 9:06 am	Public Assist	12:26 - 12:35 pm	Vehicle Stop
5:55 - 6:09 am	Road Hazard	9:06 - 9:17 am	Vehicle Stop	12:35 - 12:54 pm	Patrol
6:09 - 6:17 am	Patrol	9:17 - 9:22 am	Patrol	12:54 - 1:01 pm	Vehicle Stop
6:17 - 6:21 am	Vehicle Stop	9:22 - 9:50 am	Weekly Report	1:01 - 1:13 pm	Patrol
6:21 - 7:23 am	Patrol	9:50 - 10:02 am	Patrol	1:13 - 1:15 pm	Public Assist
7:23 - 7:31 am	Public Assist	10:02 - 10:12 am	Public Assist	1:15 - 1:55 pm	Patrol
7:31 - 7:46 am	Patrol	10:12 - 10:36 am	Vehicle Stops	1:55 - 2:08 pm	Abandoned
7:46 - 7:55 am	Vehicle Stop	10:36 - 10:55 am	Patrol	2:08 - 2:14 pm	Patrol
7:55 - 8:07 am	Patrol	10:55 - 11:05 am	Vehicle Stop	2:14 pm	Dosimeter Off

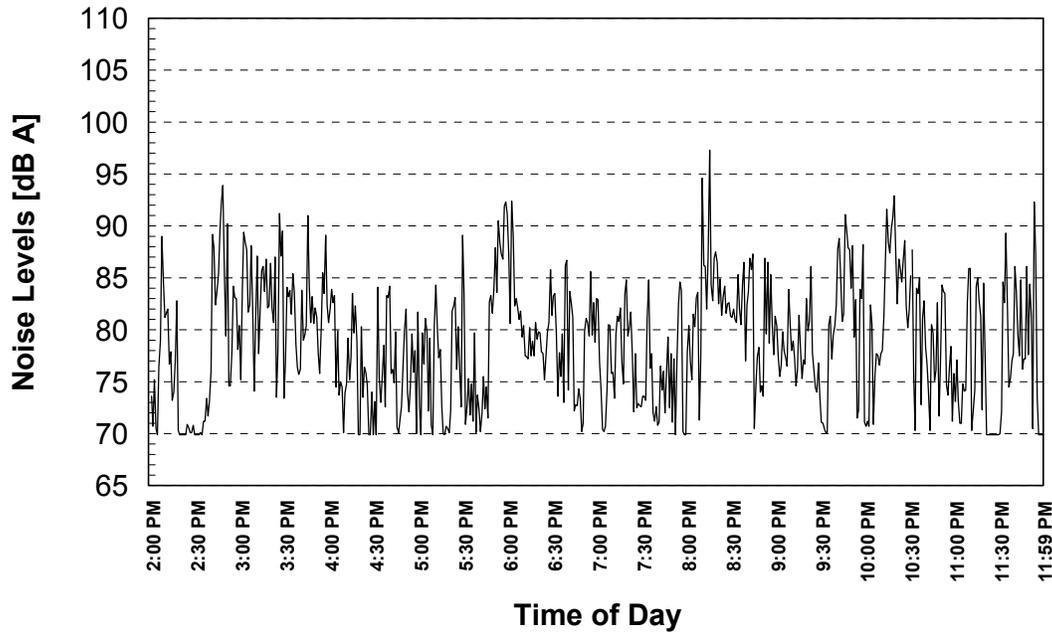
**Figure 5**  
**Noise Dosimeter Data: Trooper 374**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 11, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
6:58 - 7:07 am	Patrol	8:28 - 8:34 am	Patrol	12:17 - 12:34 pm	Vehicle Stop
7:07 - 7:14 am	Vehicle Stop	8:34 - 8:45 am	Vehicle Stop	12:34 - 12:59 pm	Abandoned Vehicle
7:14 - 7:50 am	Patrol	8:45 - 8:55 am	Patrol	12:59 - 1:28 pm	Patrol
7:50 - 7:52 am	Vehicle Stop	8:55 - 9:43 am	Vehicle Stops	1:28 - 1:40 pm	Vehicle Stop
7:52 - 8:24 am	Patrol	9:43 - 10:59 am	Warrants Served	1:40 - 2:20 pm	Patrol
8:24 - 8:28 am	Vehicle Stop	10:59 a - 12:17 p	Patrol	2:20 - 3:46 pm	Report Other
				3:46 - 6:37 pm	Patrol

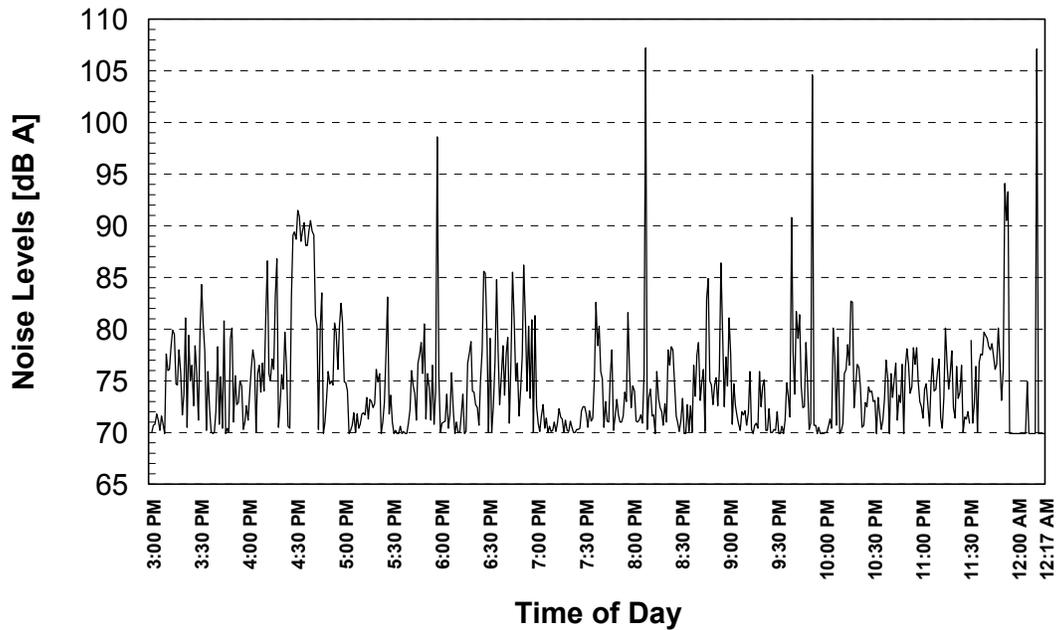
**Figure 6**  
**Noise Dosimeter Data: Trooper 381**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 11, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
1:56 - 2:15 pm	Patrol	4:06 - 4:13 pm	Vehicle Stop	7:42 - 7:57 pm	Patrol
2:15 - 2:39 pm	Report Other	4:13 - 4:42 pm	Patrol	7:57 - 8:01 pm	Vehicle Stop
2:39 - 2:46 pm	Patrol	4:42 - 4:50 pm	Vehicle Stop	8:01 - 8:07 pm	Patrol
2:46 - 2:51 pm	Vehicle Fueling	4:50 - 5:05 pm	Patrol	8:07 - 8:48 pm	Assist Local Agency
2:51 - 3:10 pm	Patrol	5:05 - 5:14 pm	Vehicle Stop	8:48 - 9:46 pm	Patrol
3:10 - 3:29 pm	Public Assist	5:14 - 5:24 pm	Patrol	9:46 - 9:53 pm	Vehicle Stop
3:29 - 3:41 pm	Patrol	5:24 - 5:30 pm	Vehicle Stop	9:53 - 9:59 pm	Patrol
3:41 - 3:44 pm	Public Assist	5:30 - 6:31 pm	Patrol	9:59 - 10:37 pm	Vehicle Stops
3:44 - 3:49 pm	Patrol	6:31 - 6:41 pm	Vehicle Stop	10:37 - 10:52 pm	Patrol
3:49 - 3:52 pm	Vehicle Stop	6:41 - 6:45 pm	Patrol	10:52 - 11:30 pm	Public Assist
3:52 - 4:06 pm	Patrol	6:45 - 7:42 pm	Break	11:30 p - 12:01 a	Patrol

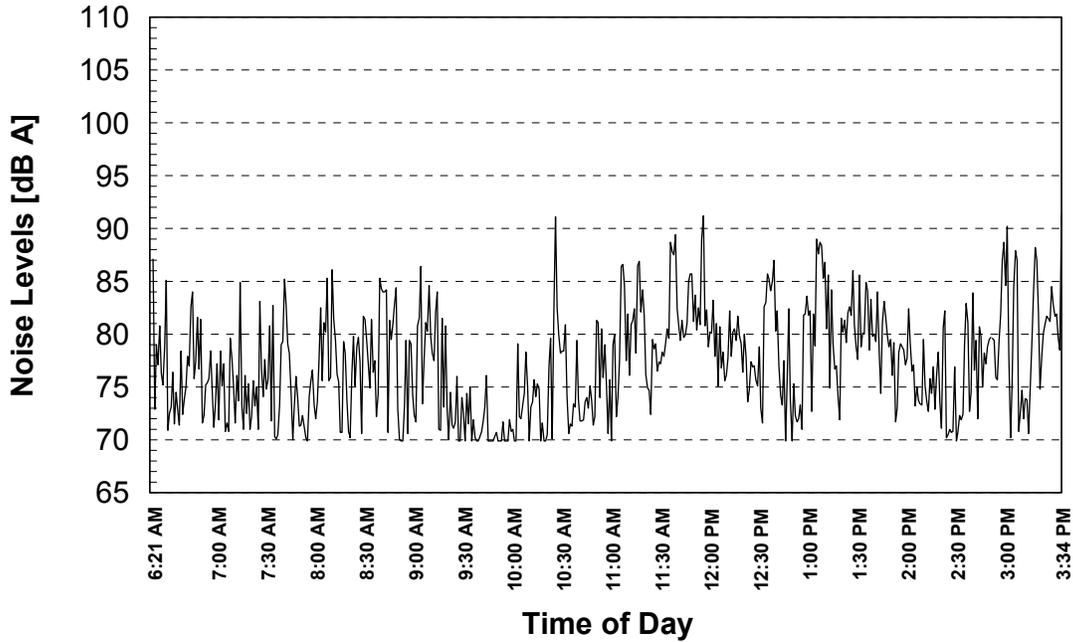
**Figure 7**  
**Noise Dosimeter Data: Trooper 414**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 11-12, 2003**



**UHP - Daily Report**

Time	Activity	Time	Activity	Time	Activity
2:55 - 3:10 pm	Patrol	6:29 - 6:35 pm	Vehicle Stop	10:07 - 10:14 pm	Patrol
3:10 - 3:12 pm	Public Assist	6:35 - 6:46 pm	Patrol	10:14 - 10:23 pm	Vehicle Stop
3:12 - 3:56 pm	Patrol	6:46 - 6:53 pm	Vehicle Stop	10:23 - 10:29 pm	Patrol
3:56 - 4:00 pm	Vehicle Stop	6:53 - 7:03 pm	Patrol	10:29 - 10:38 pm	Vehicle Stop
4:01 - 4:10 pm	Public Assist	7:03 - 8:10 pm	Break	10:38 - 10:46 pm	Patrol
4:10 - 4:13 pm	Assist Local Agency	8:10 - 8:29 pm	Patrol	10:46 - 10:54 pm	Vehicle Stop
4:13 - 4:20 pm	Patrol	8:29 - 8:48 pm	Vehicle Fueling	10:54 - 11:04 pm	Patrol
4:20 - 4:41 pm	Vehicle Stop	8:48 - 8:57 pm	Vehicle Stop	11:04 - 11:07 pm	Vehicle Stop
4:41 - 5:27 pm	Patrol	8:57 - 9:05 pm	Patrol	11:07 - 11:45 pm	Patrol
5:27 - 5:33 pm	Public Assist	9:05 - 10:07 pm	Report Other	11:45 a - 12:36 p	Special Assignment
5:33 - 6:29 pm	Patrol				

**Figure 8**  
**Noise Dosimeter Data: Trooper 522**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 11, 2003**

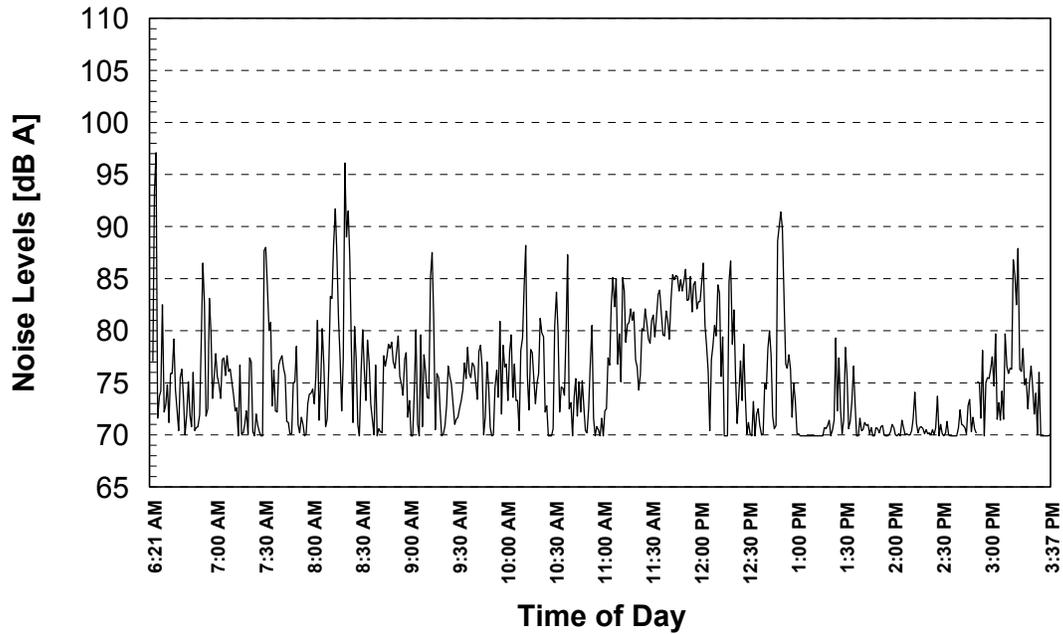


**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
6:17 - 6:30 am	Dosimeter	8:38 - 8:49 am	Vehicle Stop	1:28 - 1:54 pm	Public Assists
6:30 - 6:44 am	Patrol	8:49 - 8:53 am	Public Assist	1:54 - 2:19 pm	Patrol
6:44 - 6:49 am	Vehicle Fueling	8:53 - 9:20 am	Patrol	2:19 - 2:43 pm	Vehicle Stop
6:49 - 7:02 am	Patrol	9:20 - 10:29 am	Accident Report	2:43 - 2:57 pm	Patrol
7:02 - 7:05 am	Abandoned Vehicle	10:29 - 11:03 am	Patrol	2:57 - 3:04 pm	Public Assist
7:05 - 8:11 am	Patrol	11:03 a - 12:07 p	Break	3:04 - 3:22 pm	Vehicle Stop
8:11 - 8:23 am	Public Assist	12:07 - 12:11 pm	Patrol	3:22 - 3:34 pm	Patrol
8:23 - 8:28 am	Abandoned Vehicle	12:11 - 1:21 pm	Accident Scene	3:34 pm	Dosimeter off

8:28 - 8:38 am	Patrol	1:21 - 1:28 pm	Patrol	
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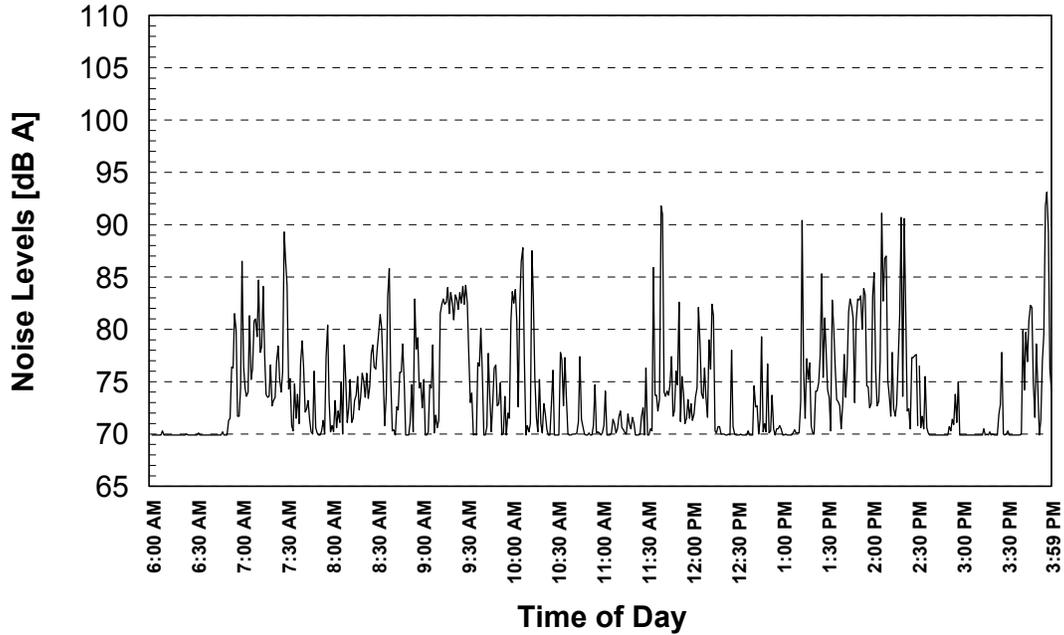
**Figure 9**  
**Noise Dosimeter Data: Trooper 335**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 11, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
5:59 - 6:28 am	Dosimeter	10:04 - 10:13 am	Vehicle Stop	12:24 - 12:41 pm	Training Support
6:28 - 6:38 am	Patrol	10:13 - 10:23 am	Patrol	12:41 - 12:53 pm	Vehicle Stop
6:38 - 6:55 am	Report Other	10:23 - 10:34 am	Vehicle Stop	12:53 - 2:47 pm	Criminal Court
6:55 - 7:33 am	Road Hazard Removal	10:34 - 10:36 am	Patrol	2:47 - 2:54 pm	Patrol
7:33 - 7:45 am	Public Assist	10:36 - 10:39 am	Public Assist	2:54 - 3:02 pm	Vehicle Stop
7:45 - 8:04 am	Patrol	10:39 - 11:08 am	Patrol	3:02 - 3:13 pm	Patrol
8:04 - 9:24 am	Accident Scene	11:08 a -12:07 p	Break	3:13 - 3:19 pm	Public Assist
9:24 - 9:35 am	Patrol	12:07 - 12:11 pm	Patrol	3:19 - 3:28 pm	Patrol
9:35 - 9:44 am	Road Hazard Removal	12:11 - 12:20 pm	Vehicle Stop	3:28 - 3:37 pm	Dosimeter Off
9:44 - 10:04 am	Patrol	12:20 - 12:24 pm	Patrol		

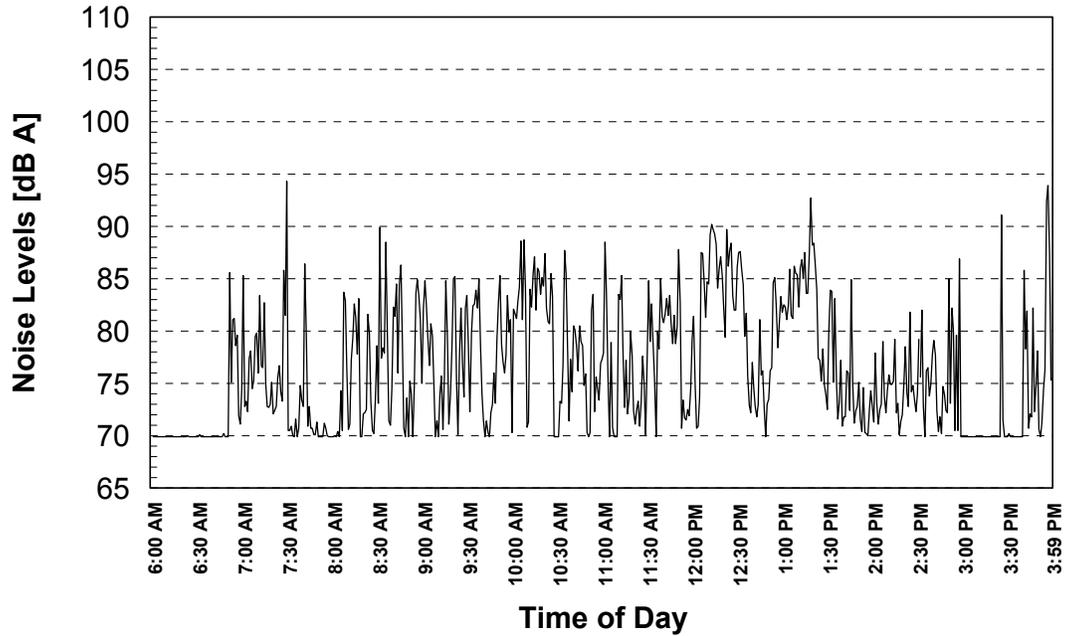
**Figure 10**  
**Noise Dosimeter Data: Trooper 313**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 11, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
6:00 - 8:15 am	Dosimeters Picked Up	9:41 - 9:44 am	Patrol	12:12 - 1:18 pm	Break
8:15 - 8:31 am	Patrol	9:44 - 9:51 am	Vehicle Fueling	1:18 - 1:53 pm	Patrol
8:31 - 8:40 am	Vehicle Stop	9:51 - 10:05 am	Patrol	1:53 - 2:05 pm	Vehicle Stop
8:40 - 8:59 am	Patrol	10:05 - 10:15 am	Vehicle Stop	2:05 - 2:33 pm	Report Other
8:59 - 9:06 am	Vehicle Stop	10:15 - 10:21 am	Patrol	2:33 - 2:54 pm	Public Assist
9:06 - 9:30 am	Patrol	10:21 - 11:39 am	Report Other	2:54 - 3:58 pm	Patrol
9:30 - 9:41 am	Vehicle Stop	11:39 a - 12:12 p	Patrol	3:58 pm	Off Duty

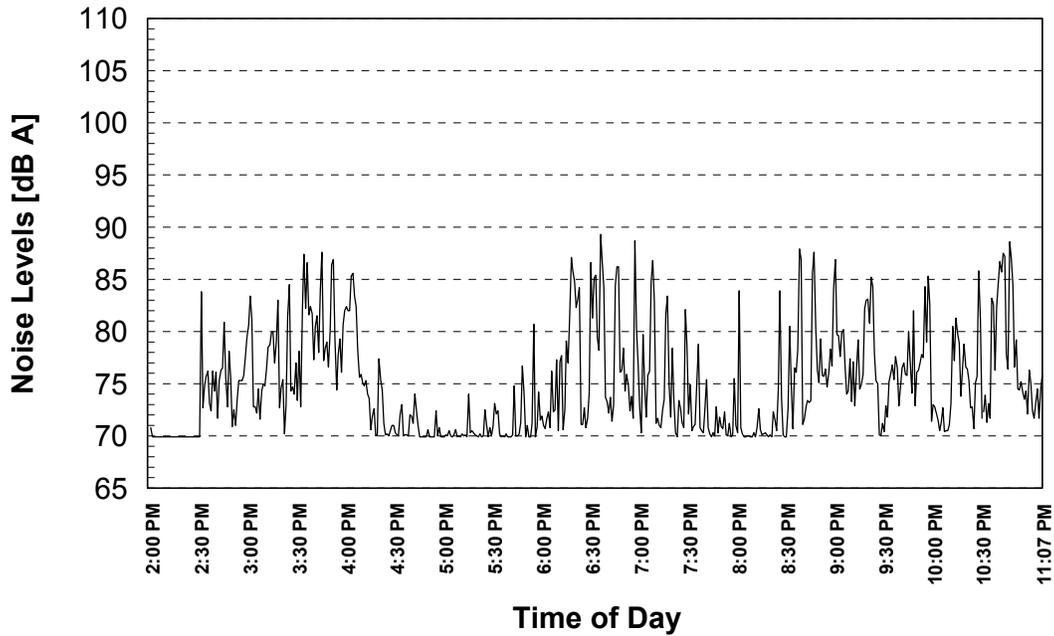
**Figure 11**  
**Noise Dosimeter Data: Trooper 315**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 11, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
6:55 am	Dosimeter	9:04 - 9:16 am	Vehicle Stop	10:54 - 11:34 am	Abandoned Vehicles
6:59 - 7:19 am	Patrol	9:16 - 9:19 am	Patrol	11:34 - 11:48 am	Patrol
7:19 - 7:28 am	Vehicle Stop	9:19 - 9:30 am	Vehicle Stop	11:48 - 11:52 am	Public Assist
7:28 - 8:07 am	Patrol	9:30 - 9:36 am	Patrol	11:52 a - 12:06 p	Patrol
8:07 - 8:09 am	Vehicle Stop	9:36 - 9:52 am	Vehicle Stop	12:06 - 1:22 pm	Accident Assist
8:09 - 8:16 am	Patrol	9:52 - 9:57 am	Patrol	1:22 - 1:26 pm	Patrol
8:16 - 8:25 am	Vehicle Stop	9:57 - 10:03 am	Vehicle Stop	1:26 - 1:34 pm	Public Assist
8:25 - 8:31 am	Patrol	10:03 - 10:09 am	Accident Assist	1:34 - 2:33 pm	Break
8:31 - 8:35 am	Public Assist	10:09 - 10:25 am	Patrol	2:33 - 2:54 pm	Patrol
8:35 - 8:43 am	Patrol	10:25 - 10:36 am	Vehicle Stop	2:54 - 3:45 pm	Supervisor Consult
8:43 - 8:58 am	Vehicle Stop	10:36 - 10:43 am	Patrol	3:45 - 3:59 pm	Patrol
8:58 - 9:04 am	Patrol	10:43 - 10:54 am	Vehicle Stop		

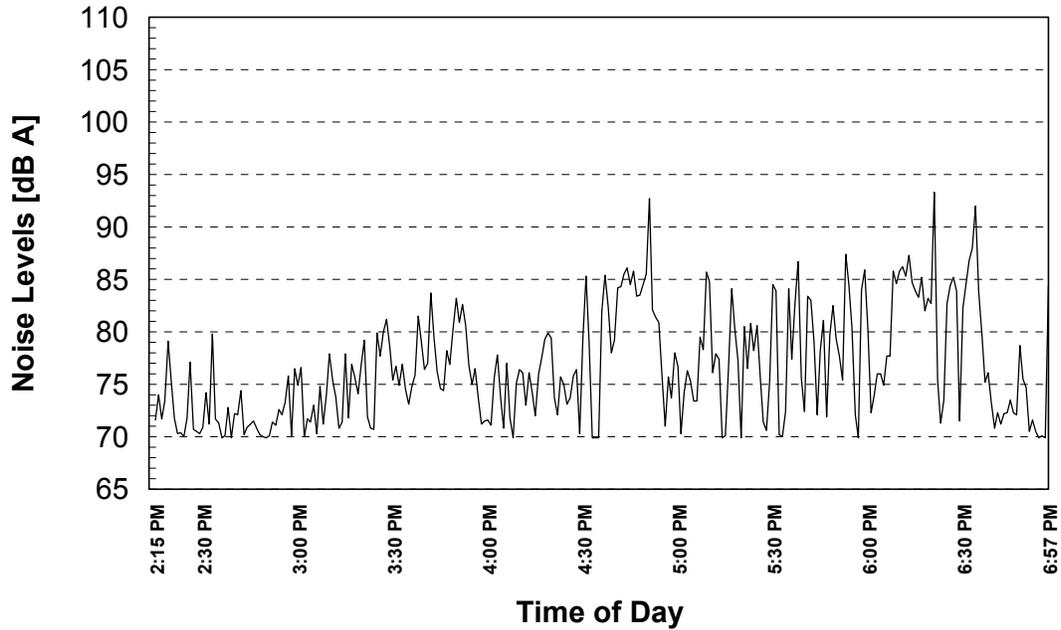
**Figure 12**  
**Noise Dosimeter Data: Trooper 394**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 11, 2003**



**UHP - Daily Report**

Time	Activity	Time	Activity	Time	Activity
1:58 - 2:36 pm	Pick Up Dosimeter	6:21 - 6:35 pm	Vehicle Stop	8:59 - 9:03 pm	Public Assist
2:36 - 2:49 pm	Vehicle Fueling	6:35 - 6:39 pm	Patrol	9:03 - 9:14 pm	Patrol
2:49 - 3:01 pm	Patrol	6:39 - 6:52 pm	Vehicle Stop	9:14 - 9:16 pm	Abandoned Vehicle
3:01 - 3:21 pm	Public Assist	6:52 - 7:08 pm	Patrol	9:16 - 9:24 pm	Patrol
3:21 - 3:24 pm	Patrol	7:08 - 7:18 pm	Vehicle Stop	9:24 - 9:39 pm	Vehicle Stop
3:24 - 3:26 pm	Public Assist	7:18 - 7:25 pm	Patrol	9:39 - 9:55 pm	Patrol
3:26 - 3:33 pm	Patrol	7:25 - 8:10 pm	Break	9:55 - 10:17 pm	Vehicle Stop
3:33 - 4:07 pm	Accident Scene	8:10 - 8:34 pm	Report Other	10:17 - 10:28 pm	Patrol
4:07 - 4:12 pm	Patrol	8:34 - 8:38 pm	Patrol	10:28 - 10:38 pm	Vehicle Stop
4:12 - 5:59 pm	Drug Exam	8:38 - 8:49 pm	Vehicle Stop	10:38 - 10:39 pm	Patrol
5:59 - 6:21 pm	Patrol	8:49 - 8:59 pm	Patrol	10:39 - 10:47 pm	Drop Off Dosimeter

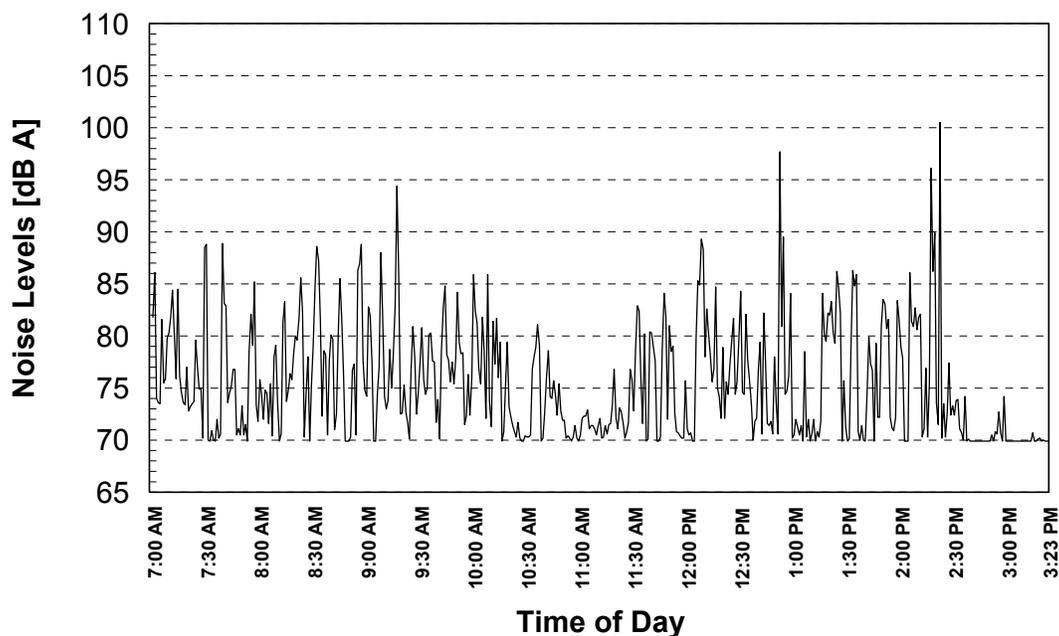
**Figure 13**  
**Noise Dosimeter Data: Trooper 433**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 11, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
2:15 pm	Pick Up Dosimeter	4:42 - 4:52 pm	Accident Assist	5:30 - 5:40 pm	Vehicle Stop
2:18 - 2:27 pm	Patrol	4:52 - 5:00 pm	Patrol	5:40 - 5:54 pm	Patrol
2:27 - 2:34 pm	Accident Follow-up	5:00 - 5:12 pm	Public Assist	5:54 - 6:00 pm	Vehicle Stop
2:34 - 3:18 pm	Patrol	5:12 - 5:24 pm	Patrol	6:00 - 6:08 pm	Patrol
3:18 - 4:14 pm	Accident Scene	5:24 - 5:27 pm	Road Hazard Removal	6:08 - 6:58 pm	Criminal Incident
4:14 - 4:31 pm	Patrol	5:27 - 5:30 pm	Patrol	6:58 pm	Dosimeter Off
4:31 - 4:42 pm	Vehicle Stop				

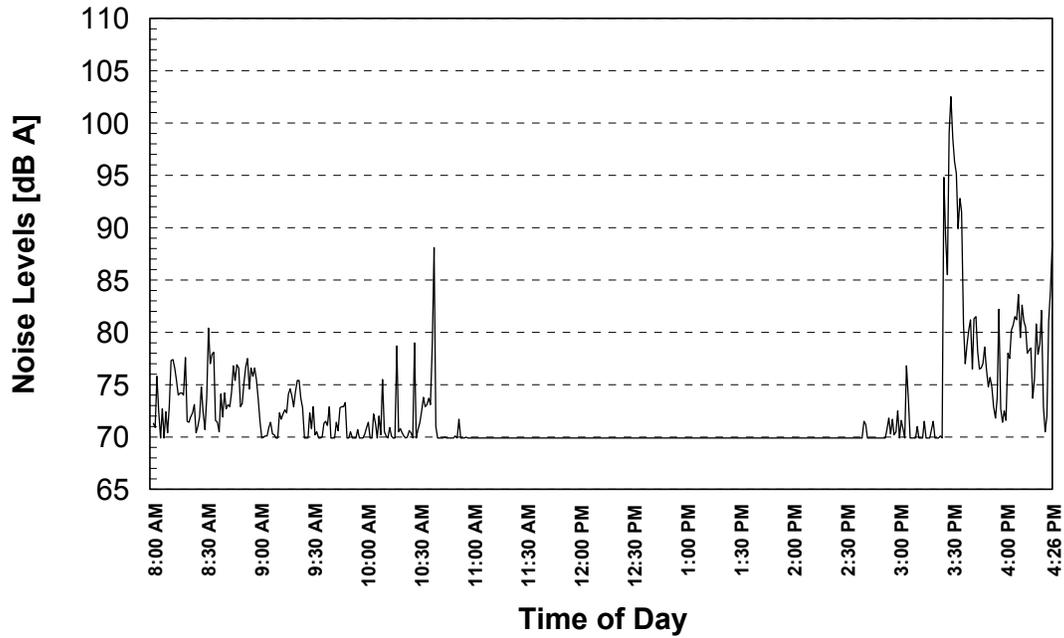
**Figure 14**  
**Noise Dosimeter Data: Trooper 454**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 11, 2003**



**UHP - Daily Report**

Time	Activity	Time	Activity	Time	Activity
7:00 - 7:04 am	Vehicle Fueling	9:14 - 9:32 am	Vehicle Fueling	11:49 a - 12:05 p	Accident Report
7:04 - 7:18 am	Dosimeters Shuttled	9:32 - 9:48 am	Vehicle Stop	12:05 - 12:26 pm	Accident Scene
7:18 - 7:27 am	Vehicle Stop	9:48 - 9:54 am	Patrol	12:26 - 12:40 pm	Road Hazard Removal
7:27 - 7:56 am	Dosimeters Shuttled	9:54 - 10:03 am	Vehicle Stop	12:40 - 1:15 pm	Incident Report
7:56 - 8:05 am	Patrol	10:03 - 10:10 am	Accident Assist	1:15 - 1:36 pm	Vehicle Stops
8:05 - 8:14 am	Vehicle Stop	10:10 - 10:21 am	Vehicle Stop	1:36 - 1:44 pm	Patrol
8:14 - 8:21 am	Patrol	10:21 - 10:45 am	Incident Report	1:44 - 1:52 pm	Vehicle Stop
8:21 - 8:34 am	Vehicle Stop	10:45 - 11:31 am	Break	1:52 - 1:57 pm	Dosimeters Shuttled
8:34 - 8:49 am	Patrol	11:31 - 11:39 am	Incident Report	1:57 - 2:10 pm	Vehicle Stop
8:49 - 9:11 am	Vehicle Stops	11:39 - 11:49 am	Vehicle Stop	2:10 - 2:52 pm	Dosimeters Shuttled
9:11 - 9:14 am	Patrol				

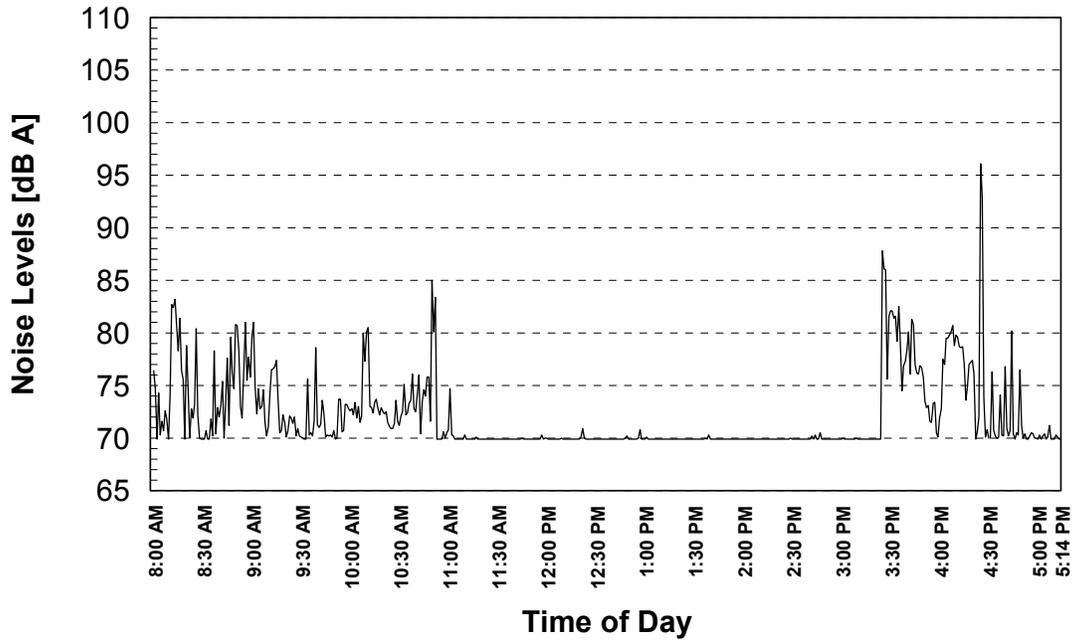
**Figure 15**  
**Noise Dosimeter Data: Trooper 410**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 11, 2003**



**UHP - Daily Report**

Time	Activity	Time	Activity	Time	Activity
7:38 - 9:07 am	Patrol	11:00 a - 3:40 p	Training	3:40 - 4:44 pm	Patrol
9:07 - 11:00 am	Report Other				

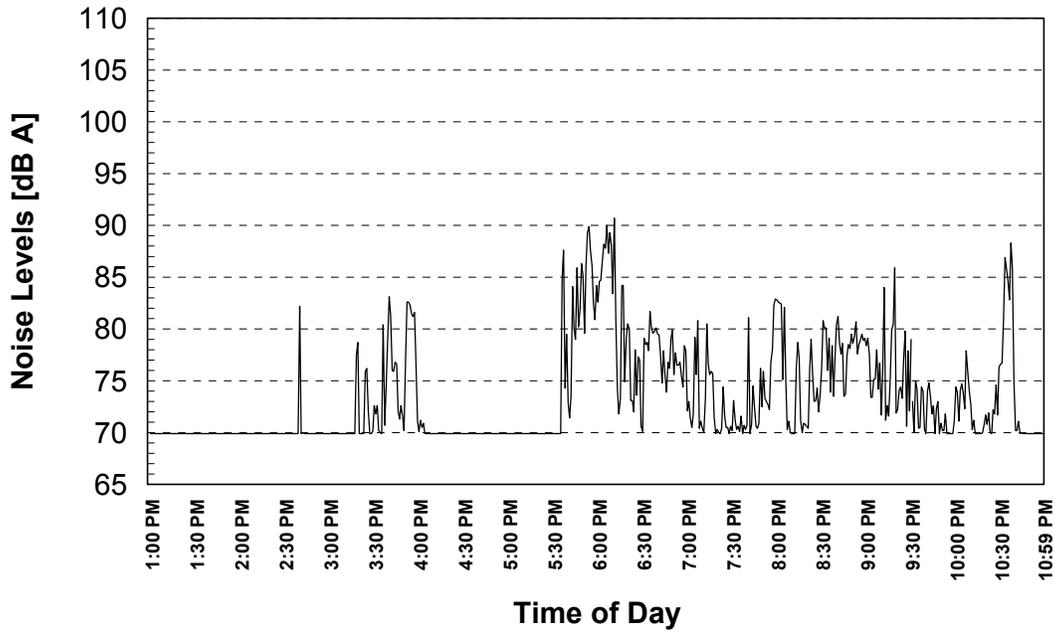
**Figure 16**  
**Noise Dosimeter Data: Trooper 188**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 11, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
7:00 - 7:59 am	Pick Up Dosimeters	9:53 - 10:54 am	Patrol	3:34 - 4:13 pm	Patrol
7:59 - 9:07 am	Report Other	10:54 a - 3:34 p	Training	4:13 - 5:00 pm	Break
9:07 - 9:53 am	Drivers License Hearing				

**Figure 17**  
**Noise Dosimeter Data: Trooper 416**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 11, 2003**

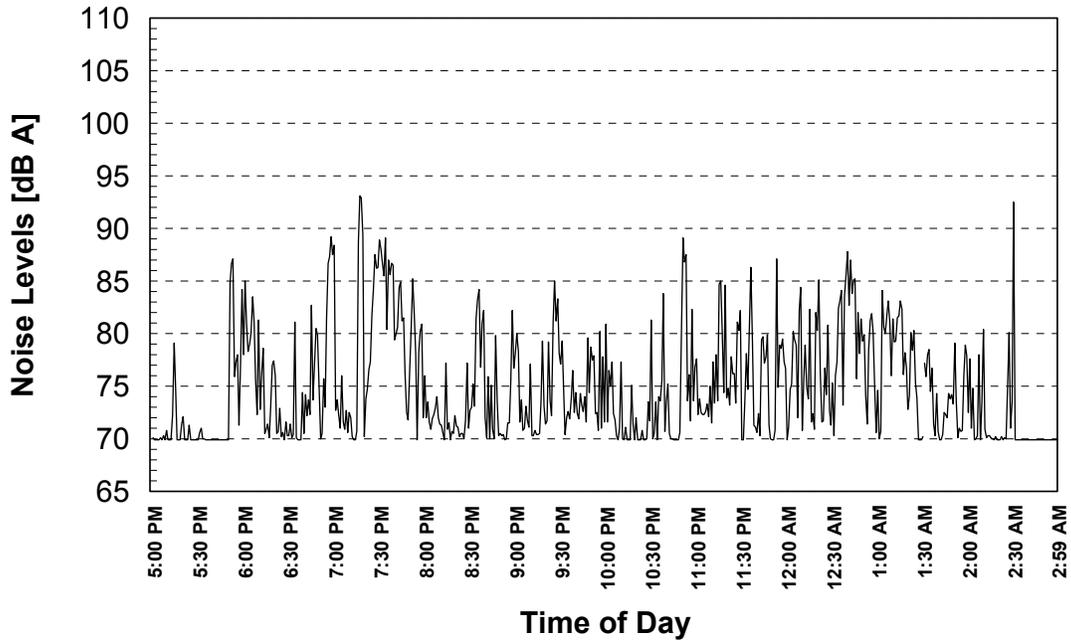


**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
11:30 - 3:30 pm	Training	5:30 - 6:25 pm	Patrol	8:19 - 8:30 pm	Patrol
3:30 - 4:00 pm	Travel	6:25 - 6:32 pm	Vehicle Stop	8:30 - 10:30 pm	DUI arrest
4:00 - 5:00 pm	Break	6:32 - 8:03 pm	Patrol	10:30 - 11:00 pm	Patrol
5:00 - 5:30 pm	Off Duty	8:03 - 8:19 pm	Vehicle Stop		



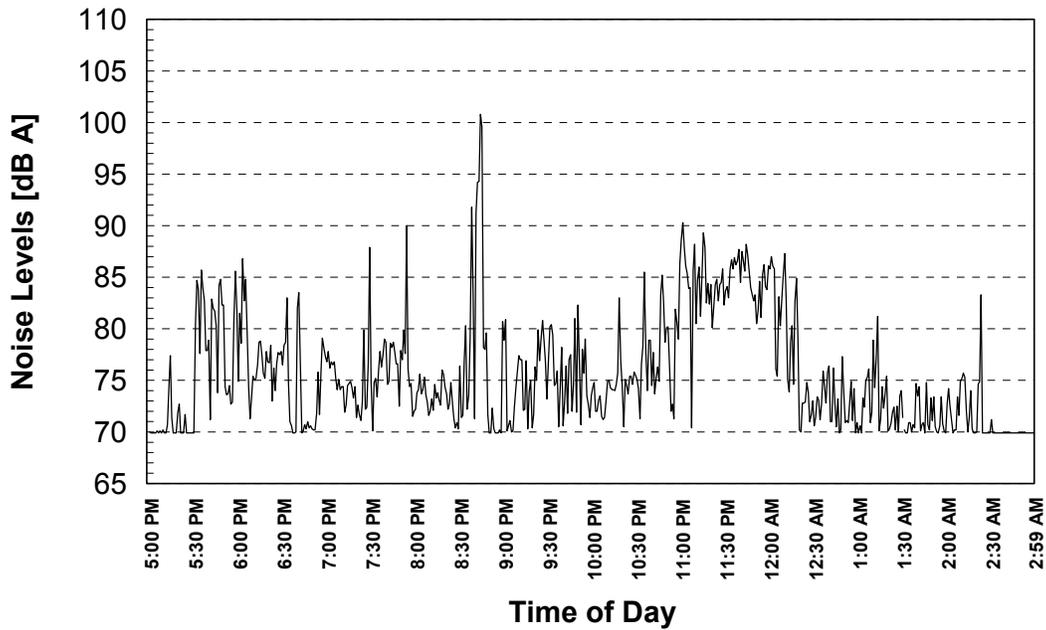
**Figure 18**  
**Noise Dosimeter Data: Trooper 288**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 12-13, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
4:58 - 7:10 pm	Patrol	11:31 - 11:38 pm	Vehicle Stop	12:05 - 12:11 am	Patrol
7:10 - 8:57 pm	Physical Custody Arrest	11:38 - 11:48 pm	Patrol	12:11 - 12:29 am	Vehicle Stop
8:87 - 9:20 pm	Break	11:48 - 11:54 pm	Vehicle Stop	12:29 - 12:53 am	Patrol
9:20 - 9:50 pm	Patrol	11:54 p - 12:00 a	Patrol	12:53 - 2:00 am	DUI Arrest
9:50 - 10:28 pm	Incident Report	12:00 - 12:05 am	Vehicle Stop	2:00 - 2:58 am	Patrol
10:28 - 11:31 pm	Patrol				

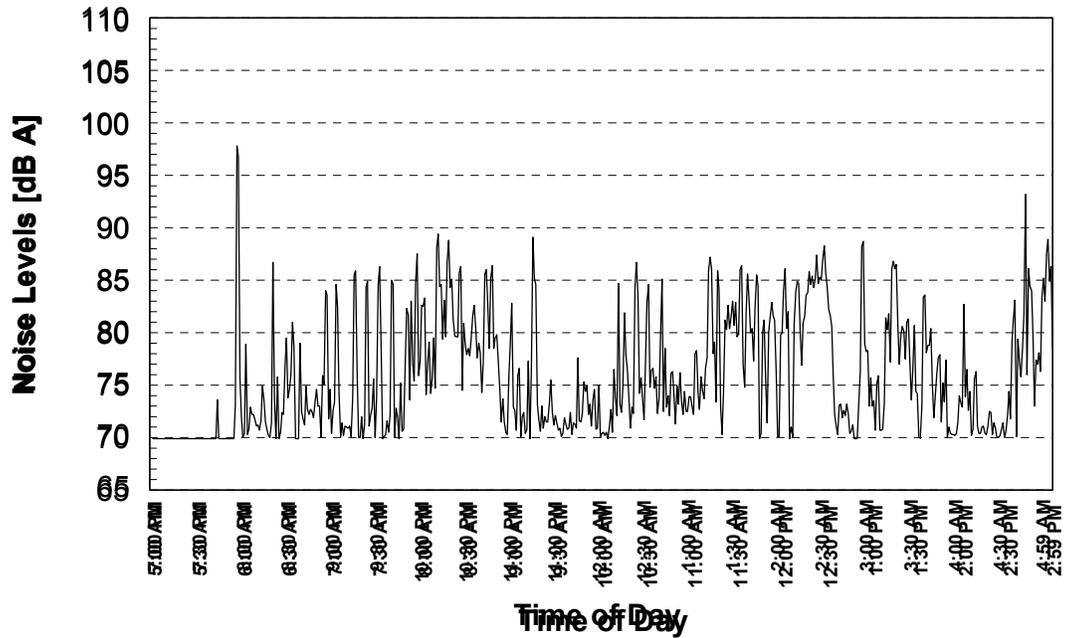
**Figure 19**  
**Noise Dosimeter Data: Trooper 320**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 12-13, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
5:00 - 5:35 pm	Pick Up Dosimeter	8:45 - 10:09 pm	Traffic Control	12:53 - 1:43 am	DUI Arrest
5:35 - 6:02 pm	Patrol	10:09 p - 12:06 a	Patrol	1:43 - 1:50 am	Patrol
6:02 - 6:11 pm	Public Assist	12:06 - 12:21 am	Public Assist	1:50 - 1:58 am	Vehicle Stop
6:11 - 6:35 pm	Patrol	12:21 - 12:28 am	Patrol	1:58 - 2:11 am	Patrol
6:35 - 6:56 pm	Vehicle Stop	12:28 - 12:34 am	Vehicle Stop	2:11 - 2:17 am	Vehicle Stop
6:56 - 7:32 pm	Patrol	12:34 - 12:46 am	Patrol	2:17 - 2:40 am	Patrol
7:32 - 8:33 pm	Break	12:46 - 12:51 am	Vehicle Stop	2:40 - 2:57 am	Drop Off Dosimeter
8:33 - 8:45 pm	Patrol	12:51 - 12:53 am	Patrol		

**Figure 20**  
**Noise Dosimeter Data: Trooper 291**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 23, 2003**



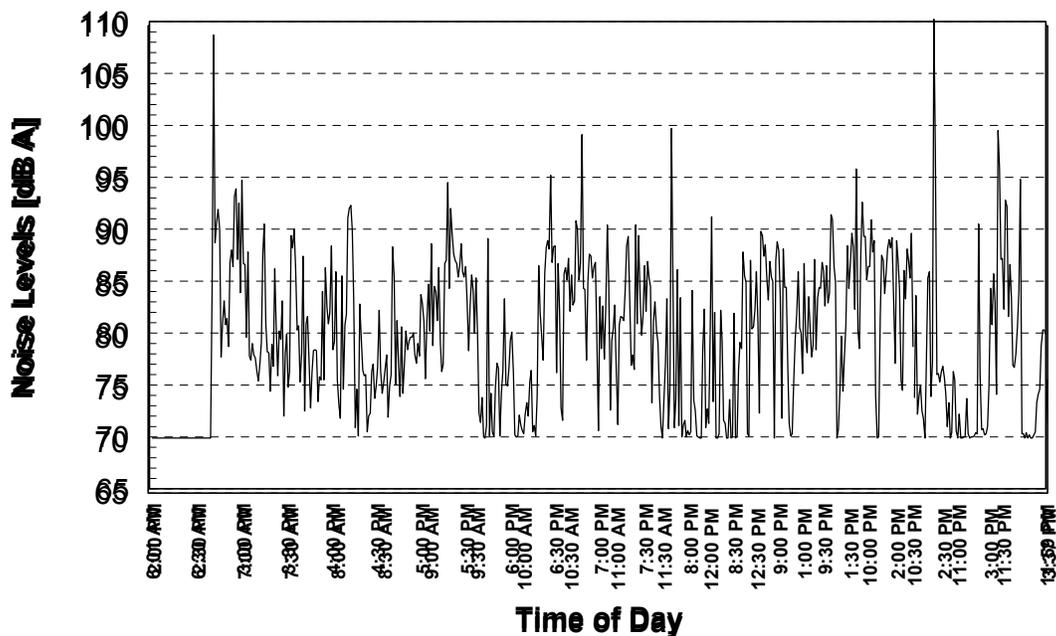
**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
6:56 - 8:51 pm	Patrol	12:24 - 12:44 am	Patrol	2:26 - 2:35 am	Patrol
8:51 - 8:53 pm	Public Assist	12:44 - 12:49 am	Vehicle Stop	2:35 - 2:40 am	Vehicle Stop
8:53 - 9:18 pm	Patrol	12:49 - 1:04 am	Patrol	2:40 - 2:52 am	Patrol
9:18 - 9:26 pm	Vehicle Stop	1:04 - 1:07 am	Vehicle Stop	2:52 - 2:57 am	Vehicle Stop
9:26 - 9:48 pm	Patrol	1:07 - 1:57 am	Patrol	2:57 - 3:09 am	Patrol
9:48 - 10:11 pm	Vehicle Stop	1:57 - 2:06 am	Vehicle Fueling	3:09 - 3:24 am	Vehicle Stop
10:11 p - 12:15 a	Patrol	2:06 - 2:15 am	Patrol	3:24 - 4:57 am	Patrol
12:15 - 12:24 am	Assist Local Agency	2:15 - 2:26 am	Vehicle Stop		

### UHP - Daily Report

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
4:55 - 5:39 am	Patrol	7:40 - 8:16 am	Patrol	11:29 - 11:33 am	Vehicle Stop
5:39 - 5:47 am	Vehicle Stops	8:16 - 8:42 am	Vehicle Stop	11:33 - 11:35 am	Patrol
5:47 - 6:17 am	Patrol	8:42 - 8:54 am	Patrol	11:35 a - 12:28 p	Vehicle Stop
6:17 - 6:30 am	Vehicle Stop	8:54 - 9:09 am	Vehicle Fueling	12:28 - 12:49 pm	Patrol
6:30 - 6:52 am	Patrol	9:09 - 10:06 am	Break	12:49 - 1:15 pm	Vehicle Stop
6:52 - 6:59 am	Vehicle Stop	10:06 - 10:20 am	Patrol	1:15 - 2:19 pm	Patrol
6:59 - 7:12 am	Patrol	10:20 - 10:27 am	Vehicle Stop	2:19 - 2:32 pm	Vehicle Stop
7:12 - 7:21 am	Vehicle Stop	10:27 - 10:35 am	Patrol	2:32 - 2:40 pm	Patrol
7:21 - 7:28 am	Patrol	10:35 - 11:14 am	Vehicle Stops	2:40 - 2:48 pm	Vehicle Stop
7:28 - 7:40 am	Vehicle Stop	11:14 - 11:29 am	Patrol	2:48 - 2:58 pm	Patrol

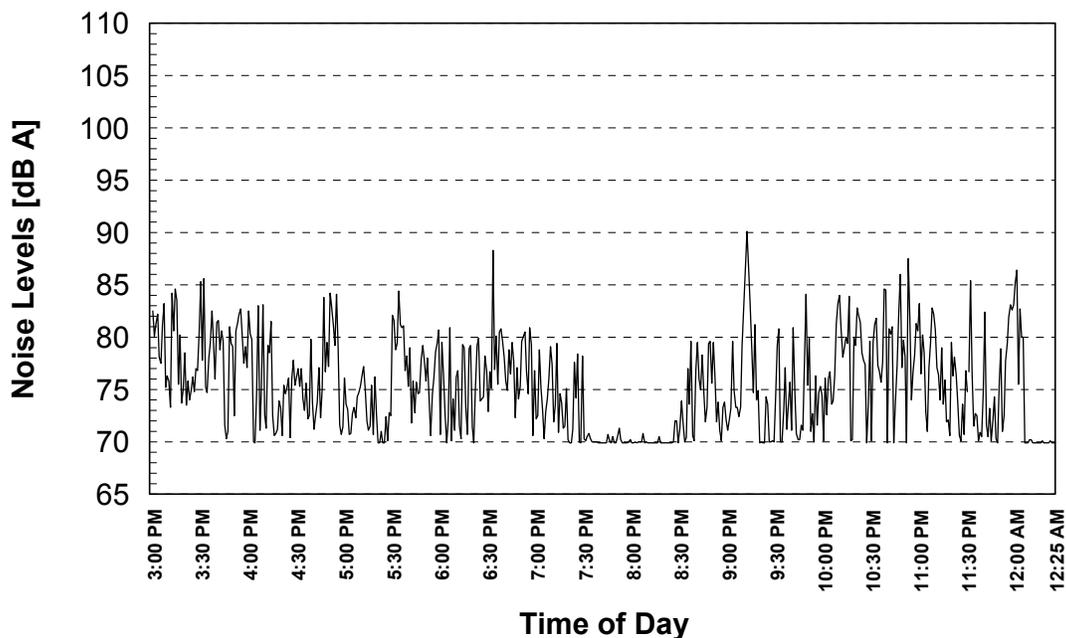
**Figure 22**  
**Noise Dosimeter Data: Trooper 282**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 12, 2003**



UHP - Daily Report

Time	Activity	Time	Activity	Time	Activity
6:01 - 6:39 am	Patrol	8:43 - 9:10 am	Patrol	12:50 - 1:04 pm	Patrol
6:39 - 6:47 am	Accident Report	9:10 - 10:04 am	Break	1:04 - 1:07 pm	Vehicle Stop
6:47 - 7:36 am	Patrol	10:04 a - 12:22 p	Patrol	1:07 - 1:17 pm	Patrol
7:36 - 7:41 am	Public Assist	12:22 - 12:31 pm	Public Assist	1:17 - 1:23 pm	Vehicle Stop
7:41 - 7:43 am	Patrol	12:31 - 12:45 pm	Patrol	1:23 - 3:37 pm	Patrol
7:43 - 8:43 am	Accident Scene	12:45 - 12:50 pm	Public Assist		

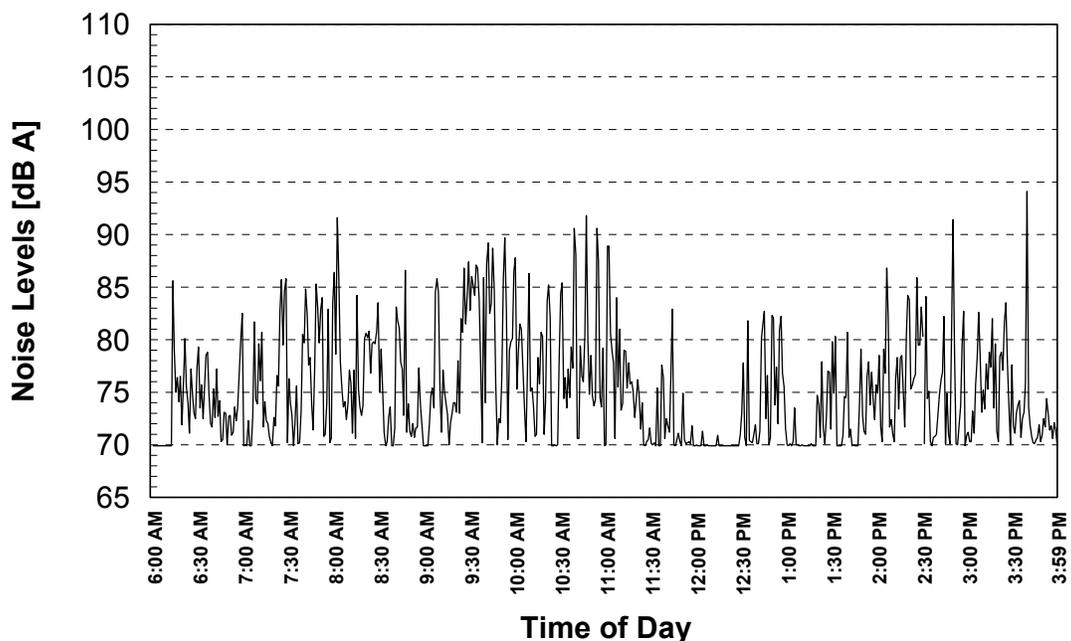
**Figure 24**  
**Noise Dosimeter Data: Trooper 414**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 12-13, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
2:01 - 2:20 pm	Patrol	4:31 - 5:15 pm	Patrol	9:01 - 9:08 pm	Patrol
2:20 - 2:46 pm	Report Other	5:15 - 6:15 pm	Accident Scene	9:08 - 9:16 pm	Vehicle Stop
2:46 - 3:38 pm	Patrol	6:15 - 6:22 pm	Patrol	9:16 - 9:38 pm	Patrol
3:38 - 3:42 pm	Vehicle Stop	6:22 - 6:29 pm	Public Assist	9:38 - 9:50 pm	Vehicle Stop
3:42 - 3:53 pm	Patrol	6:29 - 6:55 pm	Patrol	9:50 - 10:18 pm	Patrol
3:53 - 4:00 pm	Public Assists	6:55 - 6:59 pm	Vehicle Stop	10:18 - 10:46 pm	Criminal Incident
4:00 - 4:04 pm	Patrol	6:59 - 7:39 pm	Patrol	10:46 - 10:54 pm	Patrol
4:04 - 4:19 pm	Vehicle Stop	7:39 - 8:37 pm	Break	10:54 - 11:25 pm	Accident Report
4:19 - 4:22 pm	Patrol	8:37 - 8:55 pm	Patrol	11:25 p - 12:08 p	Patrol
4:22 - 4:31 pm	Vehicle Fueling	8:55 - 9:01 pm	Vehicle Stop		

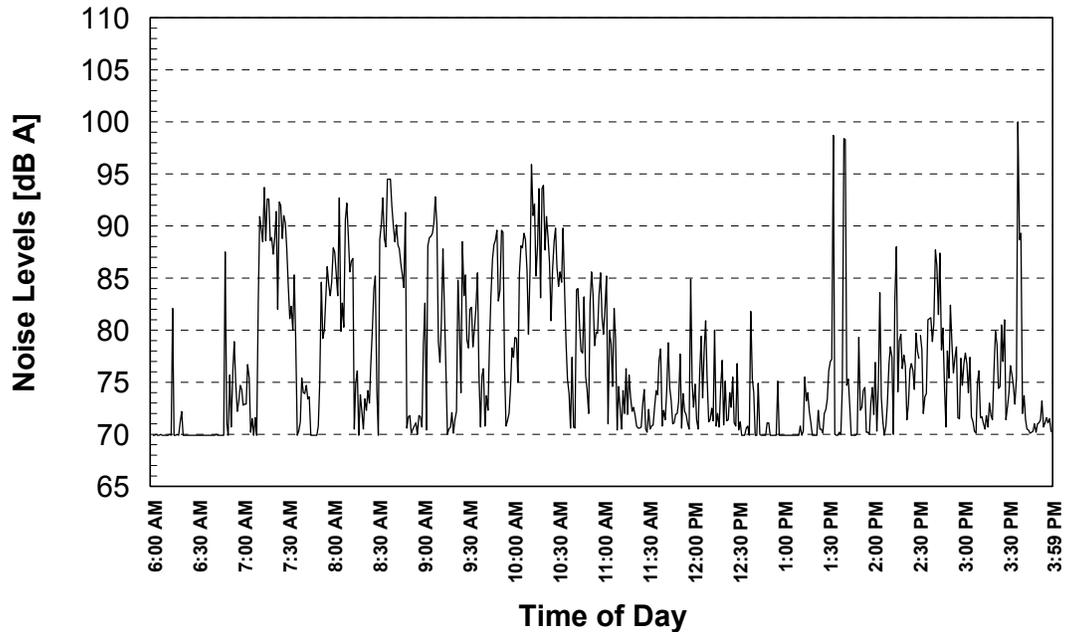
**Figure 25**  
**Noise Dosimeter Data: Trooper 286**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 12, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
2:52 - 3:29 pm	Patrol	6:25 - 6:54 pm	Patrol	10:26 - 10:34 pm	Vehicle Stop
3:29 - 3:41 pm	Road Hazard Removal	6:54 - 6:57 pm	Vehicle Stop	10:34 - 10:41 pm	Patrol
3:41 - 4:01 pm	Patrol	6:57 - 7:28 pm	Patrol	10:41 - 10:54 pm	Vehicle Stops
4:01 - 4:10 pm	Vehicle Stop	7:28 - 8:28 pm	Break	10:54 - 11:01 pm	Patrol
4:10 - 4:30 pm	Patrol	8:28 - 8:54 pm	Patrol	11:01 - 11:11 pm	Vehicle Stop
4:30 - 4:45 pm	Vehicle Stop	8:54 - 8:59 pm	Vehicle Fueling	11:11 - 11:49 pm	Patrol
4:45 - 5:30 pm	Warrant Served	8:59 - 9:07 pm	Patrol	11:49 - 11:52 pm	Assist DUI Arrest
5:30 - 5:48 pm	Patrol	9:07 - 10:02 pm	Report Other	11:52 a - 12:53 p	Patrol
5:48 - 6:25 pm	Incident Report	10:02 - 10:26 pm	Patrol		

**Figure 26**  
**Noise Dosimeter Data: Trooper 364**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 12, 2003**



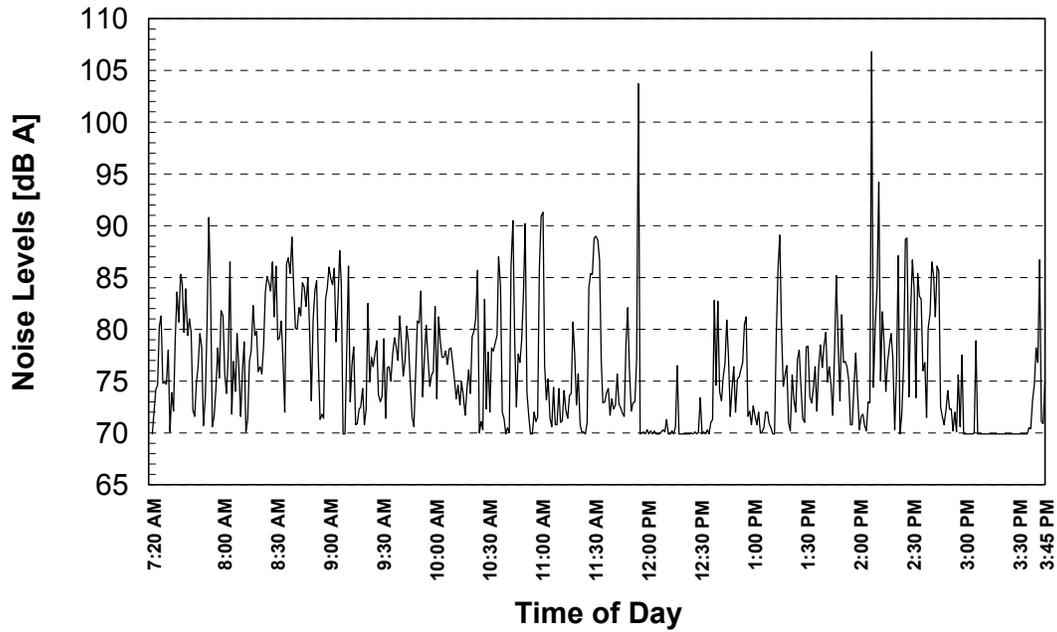
**UHP - Daily Report**

Time	Activity	Time	Activity	Time	Activity
6:00 - 6:21 am	Pick Up Dosimeter	8:49 - 8:55 am	Vehicle Fueling	10:40 - 10:48 am	Vehicle Stop
6:21 - 7:00 am	Patrol	8:55 - 9:36 am	Patrol	10:48 - 10:56 am	Patrol
7:00 - 7:08 am	Vehicle Stop	9:36 - 9:43 am	Vehicle Stop	10:56 - 11:02 am	Vehicle Stop
7:08 - 7:29 am	Patrol	9:43 - 9:47 am	Patrol	11:02 - 11:34 am	Patrol
7:29 - 7:42 am	Vehicle Stop	9:47 - 9:54 am	Vehicle Stop	11:34 a - 12:30 p	Break
7:42 - 7:53 am	Patrol	9:54 - 9:59 am	Patrol	12:30 - 12:53 pm	Patrol
7:53 - 7:59 am	Vehicle Stop	9:59 - 10:18 am	Public Assist	12:53 - 2:00 pm	Supervisor Consult
7:59 - 8:30 am	Patrol	10:18 - 10:23 am	Patrol	2:00 - 3:24 pm	Report Other
8:30 - 8:43 am	Vehicle Stop	10:23 - 10:32 am	Vehicle Stop	3:24 - 4:07 pm	Drop Off Dosimeter
8:43 - 8:49 am	Patrol	10:32 - 10:40 am	Patrol		

### UHP - Daily Report

Time	Activity	Time	Activity	Time	Activity
6:40 - 6:50 am	Pick Up Dosimeter	9:25 - 9:31 am	Patrol	12:31 - 1:30 pm	Incident Reports
6:50 - 7:37 am	Patrol	9:31 - 10:19 am	Vehicle Stops	1:30 - 2:05 pm	Patrol
7:37 - 8:06 am	Vehicle Stop	10:19 - 10:36 am	Patrol	2:05 - 2:15 pm	Citation Sign Off
8:06 - 8:15 am	Patrol	10:36 - 10:55 am	Vehicle Stop	2:15 - 2:25 pm	Patrol
8:15 - 8:33 am	Vehicle Stop	10:55 - 11:15 am	Patrol	2:25 - 2:33 pm	Vehicle Stop
8:33 - 8:49 am	Patrol	11:15 a - 12:15 p	Break	2:33 - 2:50 pm	Patrol
8:49 - 9:03 am	Vehicle Stop	12:15 - 12:17 pm	Patrol	2:50 - 3:03 pm	Vehicle Stop
9:03 - 9:16 am	Patrol	12:17 - 12:22 pm	Vehicle Fueling	3:03 - 3:45 pm	Patrol
9:16 - 9:25 am	Vehicle Stop	12:22 - 12:31 pm	Patrol	3:45 - 3:55 pm	Drop Off Dosimeter

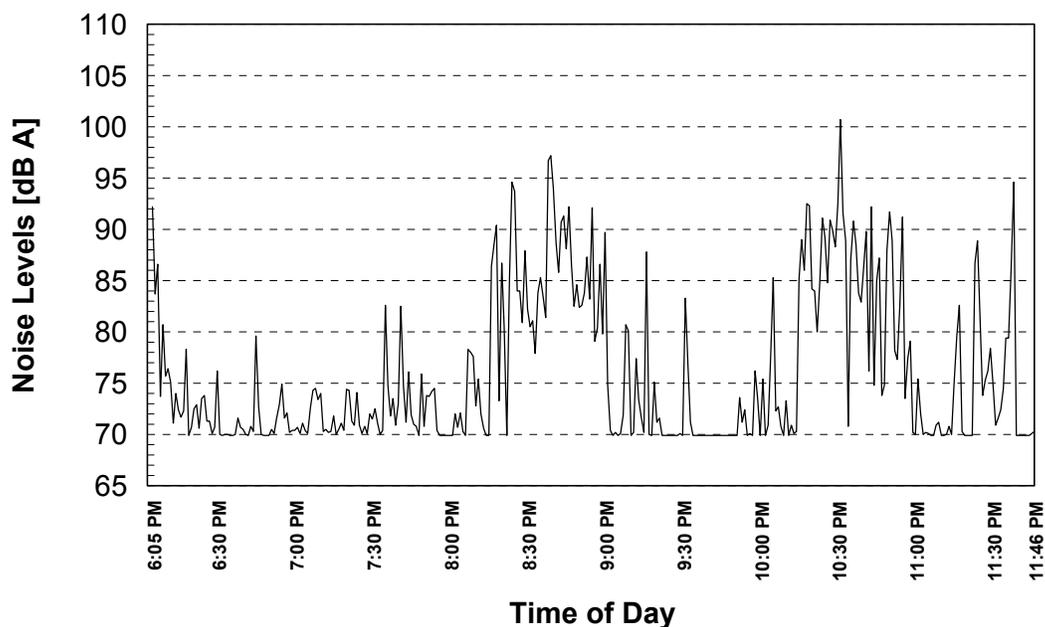
**Figure 27**  
**Noise Dosimeter Data: Trooper 313**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 12, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
7:09 - 7:30 am	Pick Up Dosimeter	10:30 - 10:38 am	Patrol	11:37 - 11:53 am	Patrol
7:30 - 9:05 am	Patrol	10:38 - 10:46 am	Vehicle Stop	11:53 a - 12:47 p	Break
9:05 - 9:13 am	Vehicle Stop	10:46 - 10:50 am	Patrol	12:47 - 2:02 pm	Patrol
9:13 - 10:23 am	Patrol	10:50 - 11:03 am	Vehicle Stop	2:02 -4:50 pm	Drop Off Dosimeter
10:23 - 10:30 am	Vehicle Stop	11:03 - 11:37 am	Safety Education		

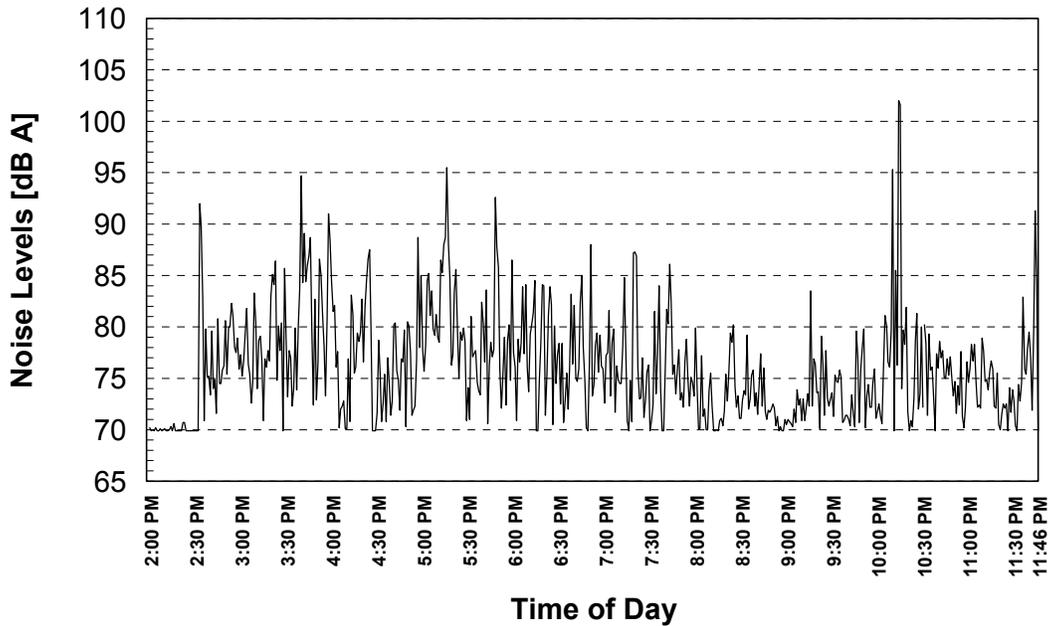
**Figure 28**  
**Noise Dosimeter Data: Trooper 394**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 12, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
6:00 - 6:18 pm	Patrol	8:27 - 8:42 pm	Patrol	11:28 - 11:41 pm	Patrol
6:18 - 8:10 pm	Training	8:42 - 9:00 pm	Report Other	11:41 - 11:44 pm	Vehicle Fueling
8:10 - 8:17 pm	Patrol	9:00 - 10:00 pm	Break	11:44 - 11:58 pm	Drop Off Dosimeter
8:17 - 8:27 pm	Public Assist	10:00 - 11:28 pm	Report Other		

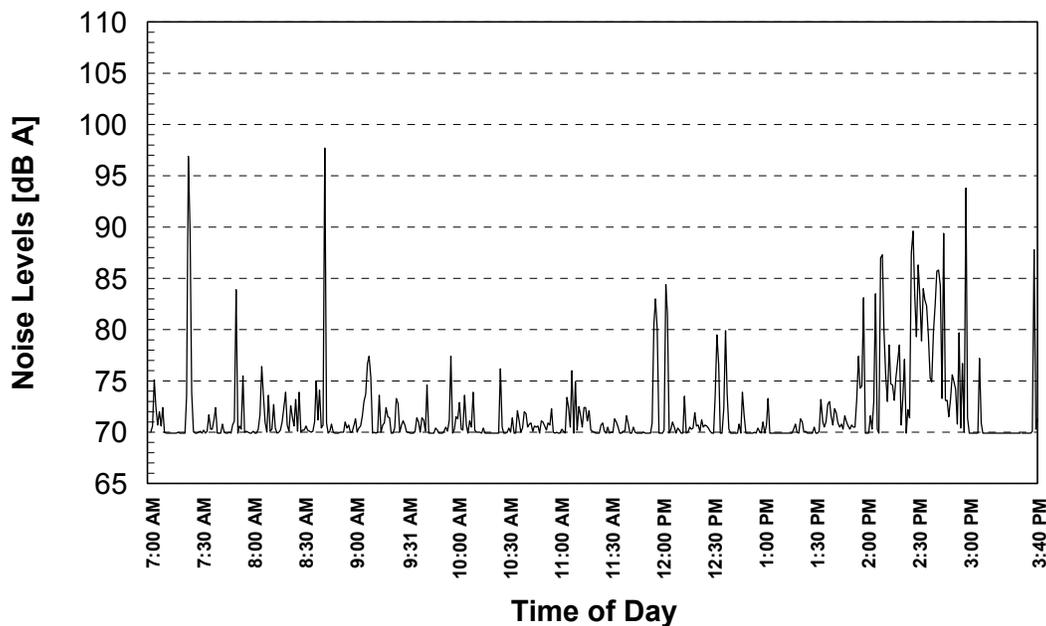
**Figure 29**  
**Noise Dosimeter Data: Trooper 433**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 12, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
2:00 - 3:23 pm	Patrol	5:33 - 5:44 pm	Road Hazard Removal	7:36 - 7:47 pm	Vehicle Stop
3:23 - 3:31 pm	Vehicle Stop	5:44 - 5:52 pm	Public Assist	7:47 - 7:54 pm	Patrol
3:31 - 3:39 pm	Patrol	5:52 - 6:14 pm	Patrol	7:54 - 7:58 pm	Vehicle Stop
3:39 - 3:48 pm	Public Assist	6:14 - 6:23 pm	Vehicle Stop	7:58 - 8:01 pm	Patrol
3:48 - 3:55 pm	Patrol	6:23 - 6:44 pm	Patrol	8:01 - 8:22 pm	Report Other
3:55 - 4:40 pm	Accident Scene	6:44 - 6:53 pm	Vehicle Stop	8:22 - 9:19 pm	Break
4:40 - 4:51 pm	Patrol	6:53 - 7:03 pm	Patrol	9:19 - 10:00 pm	Patrol
4:51 - 4:53 pm	Public Assist	7:03 - 7:10 pm	Road Hazard Removal	10:00 - 10:26 pm	Report Other
4:53 - 4:57 pm	Patrol	7:10 - 7:13 pm	Patrol	10:26 - 10:30 pm	Patrol
4:57 - 5:00 pm	Vehicle Stop	7:13 - 7:24 pm	Vehicle Stop	10:30 - 10:35 pm	Vehicle Stop
5:00 - 5:25 pm	Criminal Incident	7:24 - 7:36 pm	Patrol	10:35 - 11:58 pm	Patrol
5:25 - 5:33 pm	Patrol				

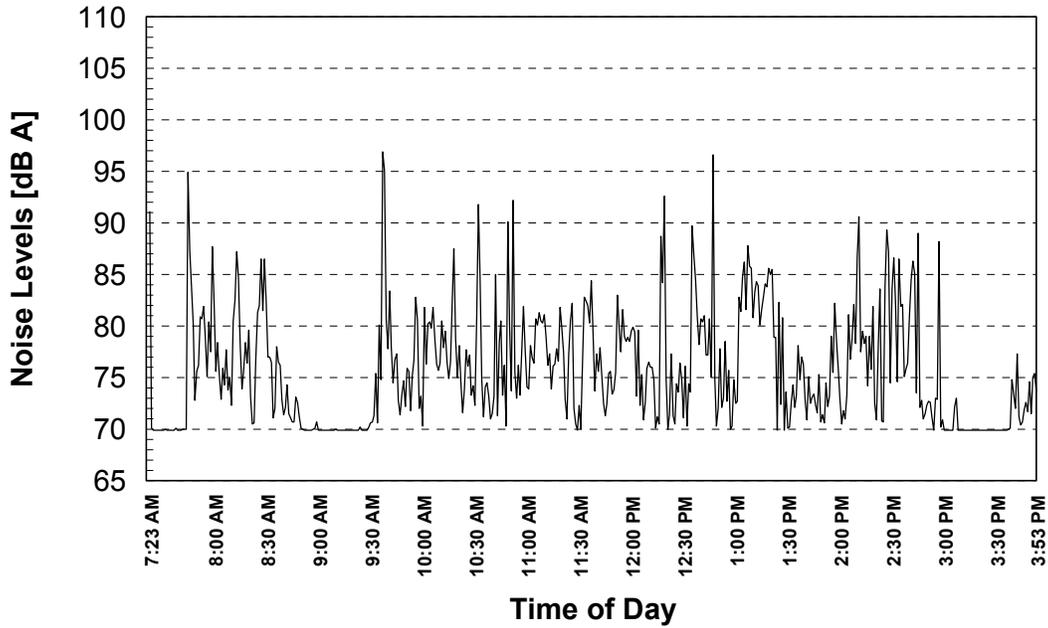
**Figure 30**  
**Noise Dosimeter Data: Trooper 208**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 12, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
6:57 - 7:07 am	Patrol	11:41 - 11:55 am	Patrol	1:00 - 1:20 pm	Tire Repair
7:07 - 7:12 am	Vehicle Fueling	11:55 a - 12:06 p	Vehicle Stop	1:20 - 1:32 pm	Patrol
7:12 - 9:11 am	Patrol	12:06 - 12:32 pm	Patrol	1:32 - 1:59 pm	Break
9:11 - 11:19 am	Vehicle Repair	12:32 - 12:39 pm	Vehicle Stop	1:59 - 2:59 pm	Patrol
11:19 - 11:33 am	Patrol	12:39 - 1:00 pm	Patrol	2:59 pm	Off Duty
11:33 - 11:41 am	Vehicle Stop				

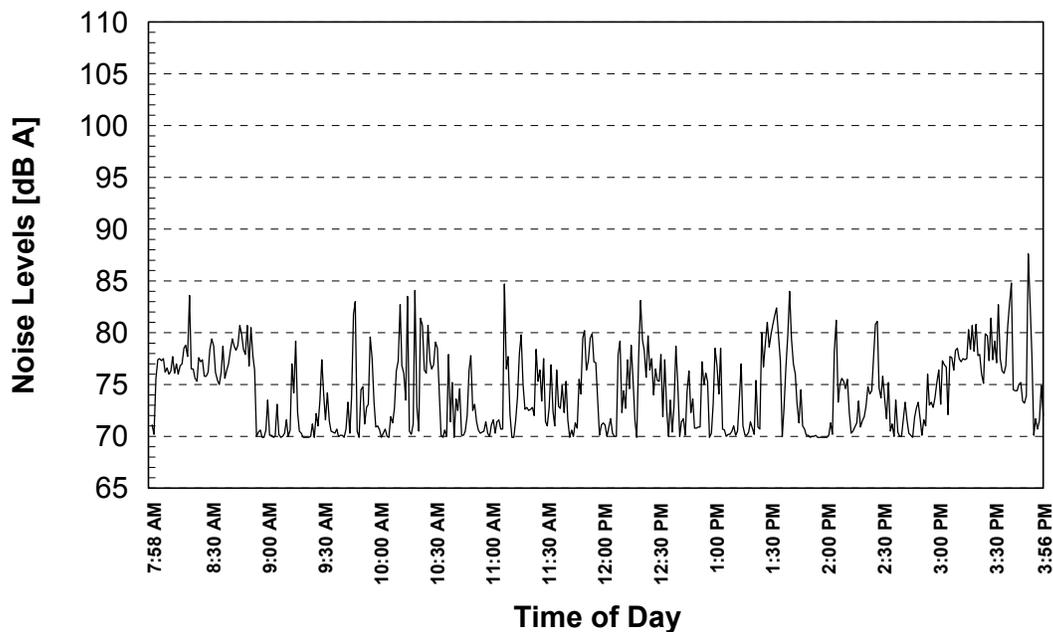
**Figure 31**  
**Noise Dosimeter Data: Trooper 454**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 12, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
6:57 - 7:49 am	Pick Up Dosimeters	10:30 - 10:45 am	Vehicle Fueling	11:39 a - 1:00 p	Patrol
7:49 - 9:44 am	Court Preparation	10:45 - 10:46 am	Patrol	1:00 - 1:27 pm	Public Assist
9:44 - 9:55 am	Patrol	10:46 - 11:00 am	Vehicle Stop	1:27 - 2:05 pm	Break
9:55 - 10:03 am	Vehicle Stop	11:00 - 11:22 am	Patrol	2:05 - 2:25 pm	Drop Off Dosimeters
10:03 - 10:30 am	Patrol	11:22 - 11:39 am	Public Assist		

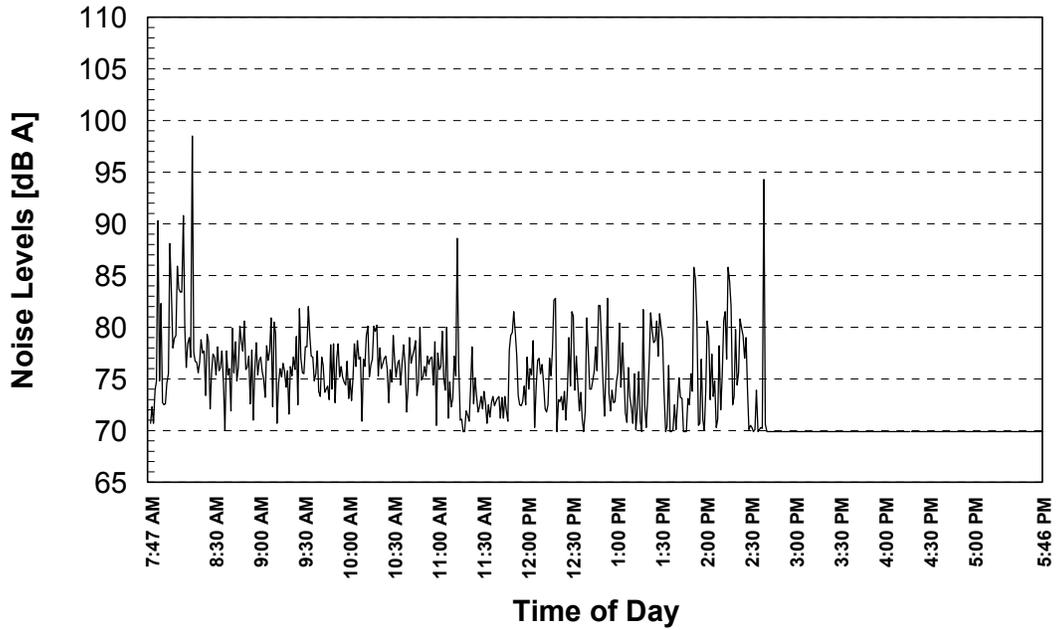
**Figure 32**  
**Noise Dosimeter Data: Trooper 410**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 12, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
7:53 - 9:15 am	Patrol	10:43 - 10:51 am	Vehicle Stop	12:26 - 12:40 pm	Patrol
9:15 - 9:30 am	Vehicle Stop	10:51 - 11:09 am	Patrol	12:40 - 12:48 pm	Vehicle Stop
9:30 - 9:46 am	Patrol	11:09 - 11:56 am	Vehicle Stop	12:48 - 12:54 pm	Patrol
9:46 - 9:53 am	Vehicle Stop	11:25 a - 12:10 p	Patrol	12:54 - 1:03 pm	Vehicle Stop
9:53 - 10:33 am	Patrol	12:10 - 12:13 pm	Vehicle Stop	1:03 - 4:11 pm	Patrol
10:33 - 10:39 am	Vehicle Stop	12:13 - 12:16 pm	Patrol	4:11 pm	Off Duty
10:39 - 10:43 am	Patrol	12:16 - 12:26 pm	Vehicle Stops		

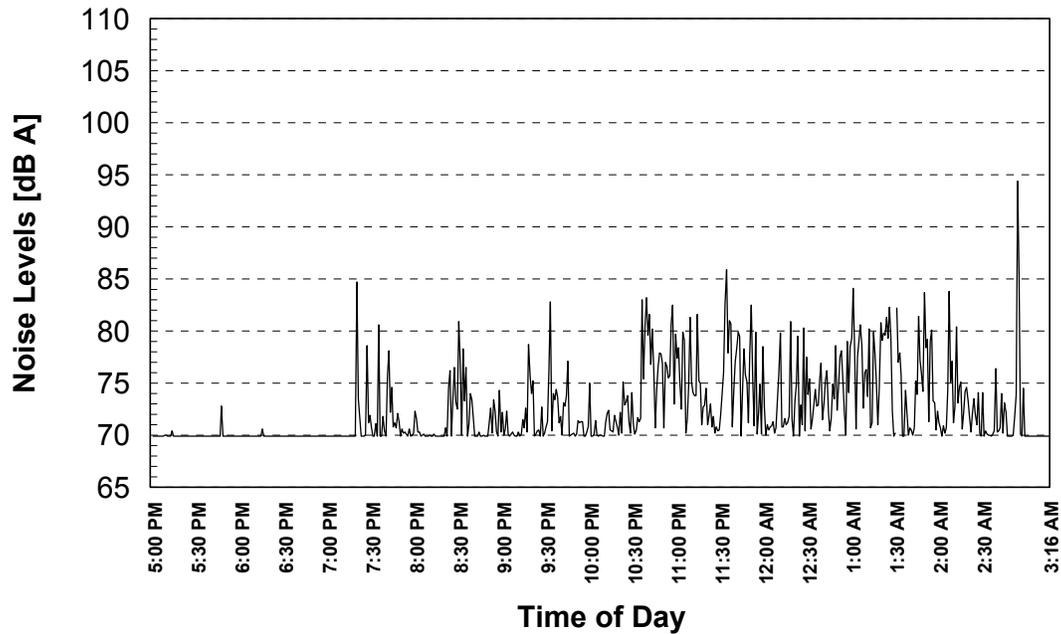
**Figure 33**  
**Noise Dosimeter Data: Trooper 188**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 12, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
7:00 - 8:50 am	Pick Up Dosimeter	12:04 - 12:10 pm	Patrol	1:25 - 2:33 pm	Vehicle Impound
8:50 - 11:00 am	Patrol	12:10 - 12:23 pm	Vehicle Stop	2:33 - 3:00 pm	Report Other
11:00 - 11:08 am	Public Assist	12:23 - 12:25 pm	Patrol	3:00 - 4:00 pm	Break
11:08 - 11:58 am	Patrol	12:25 - 12:49 pm	Vehicle Stops	4:00 - 5:00 pm	Physical Fitness
11:58 a - 12:04 p	Vehicle Stop	12:49 - 1:25 pm	Patrol		

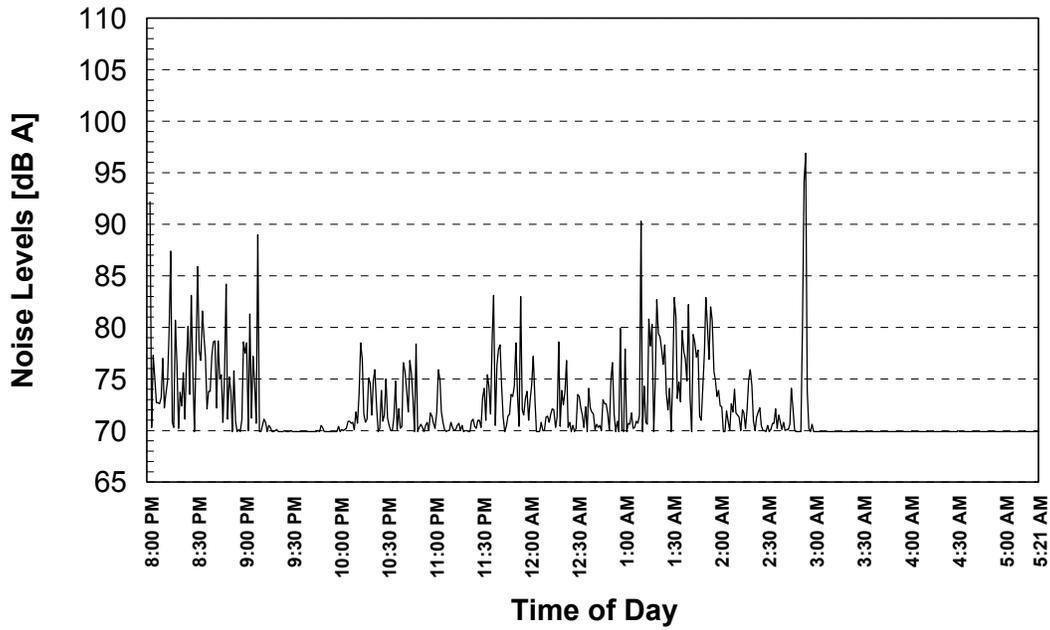
**Figure 34**  
**Noise Dosimeter Data: Trooper 416**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 12-13, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
5:00 - 6:00 pm	Physical Fitness	11:11 - 11:16 pm	Vehicle Stop	1:15 - 1:21 am	Patrol
6:00 - 7:00 pm	Break	11:16 - 11:40 pm	Patrol	1:21 - 1:29 am	Vehicle Stop
7:00 - 7:25 pm	Patrol	11:40 - 11:49 pm	Vehicle Stop	1:29 - 1:30 am	Patrol
7:25 - 7:38 pm	Vehicle Fueling	11:49 p - 12:18 a	Patrol	1:30 - 2:15 am	DUI Arrest
7:38 - 7:46 pm	Patrol	12:18 - 12:21 am	Vehicle Stop	2:15 - 2:25 am	Patrol
7:46 - 10:00 pm	Incident Report	12:21 - 12:28 am	Patrol	2:25 - 3:00 am	Special Assignment
10:00 - 10:47 pm	Patrol	12:28 - 12:56 am	Criminal Incident	3:00 - 3:16 am	Patrol
10:47 - 11:08 pm	Vehicle Stop	12:56 - 1:00 am	Patrol	3:16 am	Off Duty
11:08 - 11:11 pm	Patrol	1:00 - 1:15 am	Vehicle Stop		

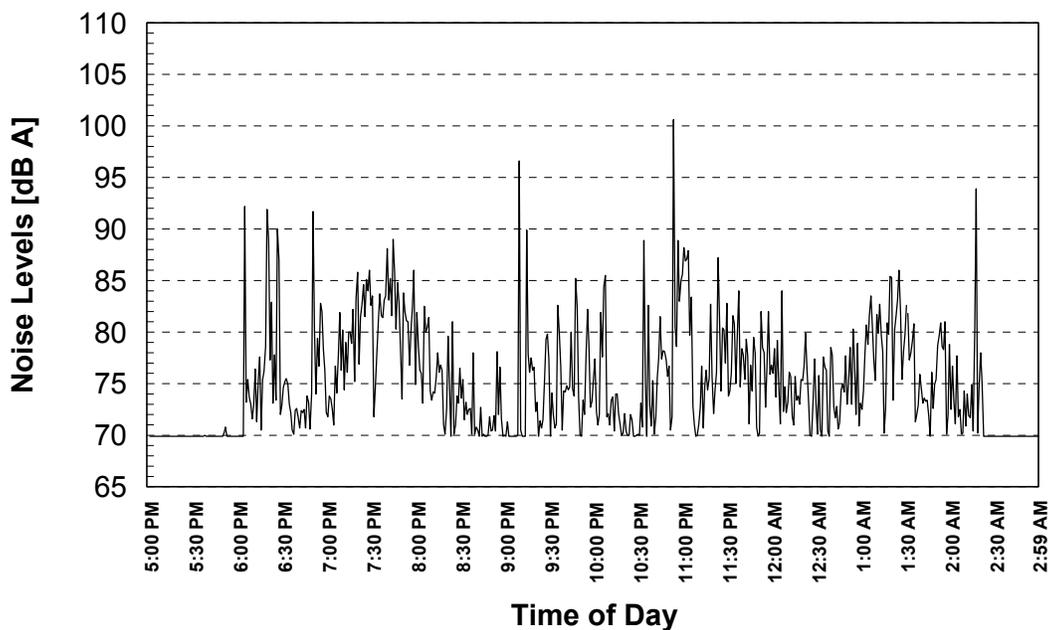
Figure 35  
Noise Dosimeter Data: Trooper 317  
Utah Highway Patrol  
HETA 2003-0094  
March 12-13, 2003



**UHP - Daily Report**

REPORT UNAVAILABLE

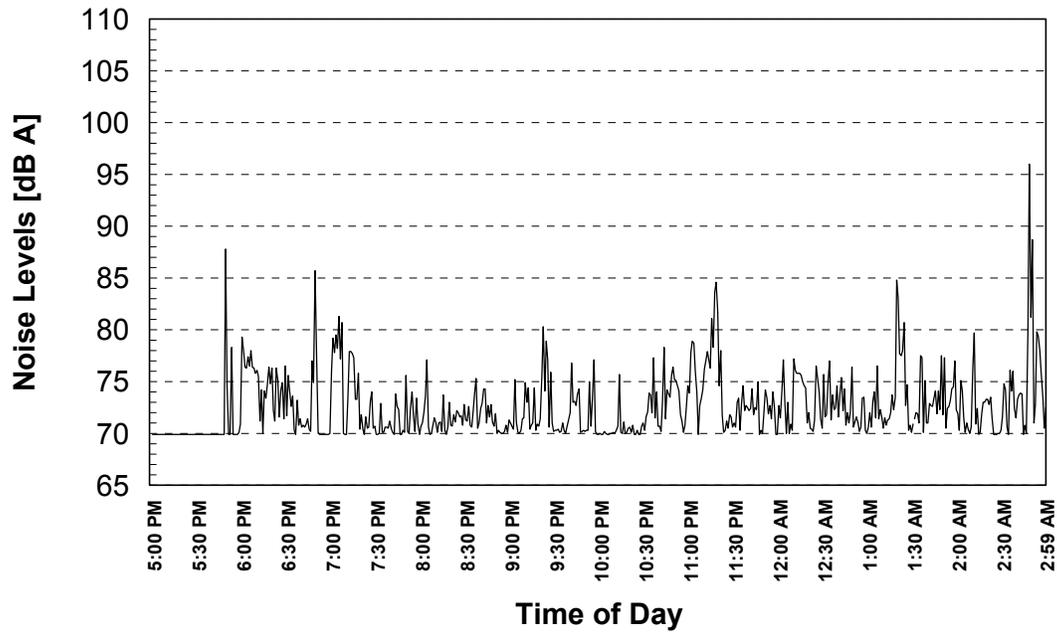
**Figure 36**  
**Noise Dosimeter Data: Trooper 288**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 13-14, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
3:27 - 6:20 pm	Patrol	9:30 - 9:36 pm	Vehicle Stop	11:50 p - 12:27 a	Vehicle Stop
6:20 - 6:24 pm	Public Assist	9:36 - 9:51 pm	Patrol	12:27 - 1:25 am	Patrol
6:24 - 8:18 pm	Patrol	9:51 - 9:57 pm	Vehicle Stop	1:25 - 1:52 am	Criminal Incident
8:18 - 9:17 pm	Break	9:57 - 11:50 pm	Patrol	1:52 - 3:27 am	Patrol
9:17 - 9:30 pm	Patrol				

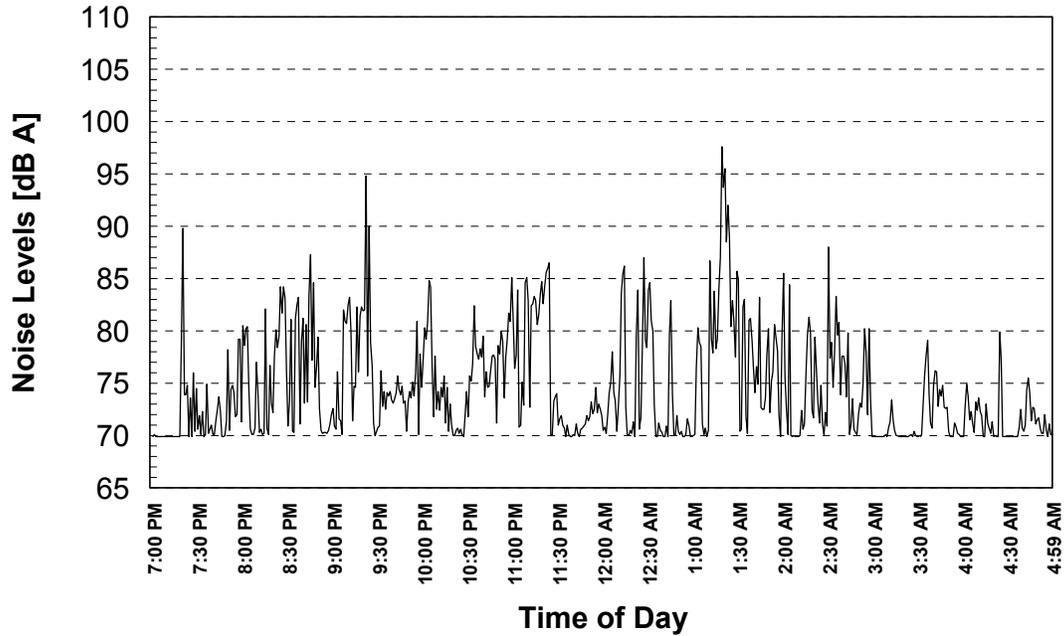
**Figure 37**  
**Noise Dosimeter Data: Trooper 320**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 13-14, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
5:58 - 6:14 pm	Pick Up Dosimeter	9:56 - 10:39 pm	Break	12:05 - 12:47 am	Patrol
6:14 - 6:27 pm	Patrol	10:39 - 10:56 pm	Patrol	12:47 - 1:05 am	Vehicle Stops
6:27 - 6:55 pm	Vehicle Stop	10:56 - 11:08 pm	Criminal Incident	1:05 - 1:15 am	Patrol
6:55 - 7:05 pm	Patrol	11:08 - 11:51 pm	Patrol	1:15 - 2:12 am	Criminal Incident
7:05 - 9:43 pm	Crew Meeting	11:51 p - 12:05 a	Criminal Incident	2:12 - 3:03 am	Patrol
9:43 - 9:56 pm	Patrol				

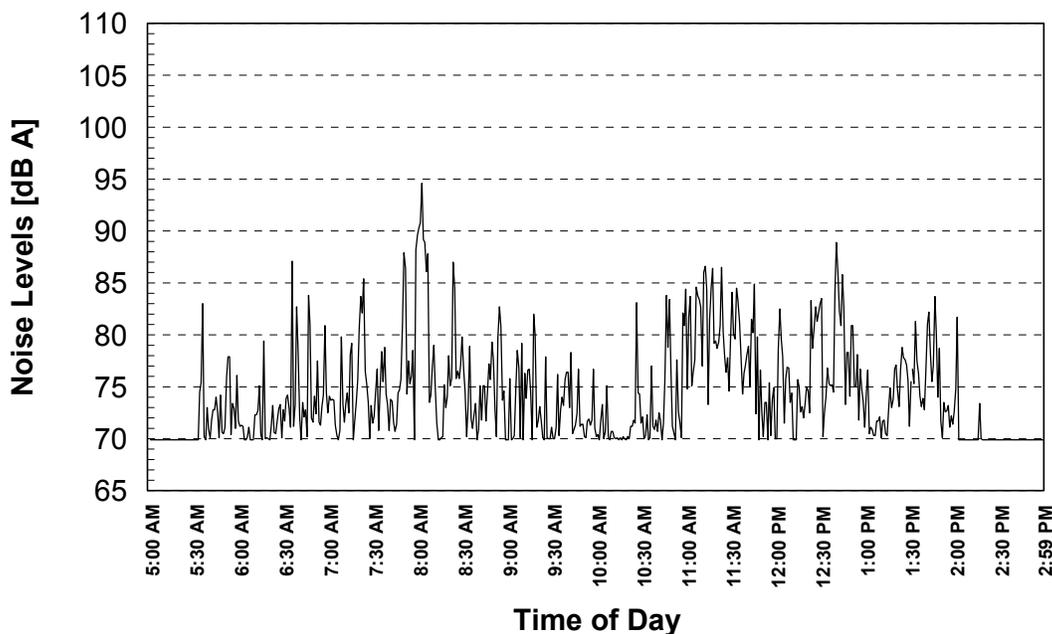
**Figure 38**  
**Noise Dosimeter Data: Trooper 273**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 13-14, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
6:56 - 7:18 pm	Patrol	11:31 p - 12:17 a	Patrol	1:07 - 3:06 am	Warrants Served
7:18 - 9:27 pm	Crew Meeting	12:17 - 12:24 am	Vehicle Stop	3:06 - 3:18 am	Patrol
9:27 - 11:22 pm	Patrol	12:24 - 1:07 pm	Patrol	3:18 - 6:39 am	Incident Report
11:22 - 11:31 pm	Road Hazard Removal				

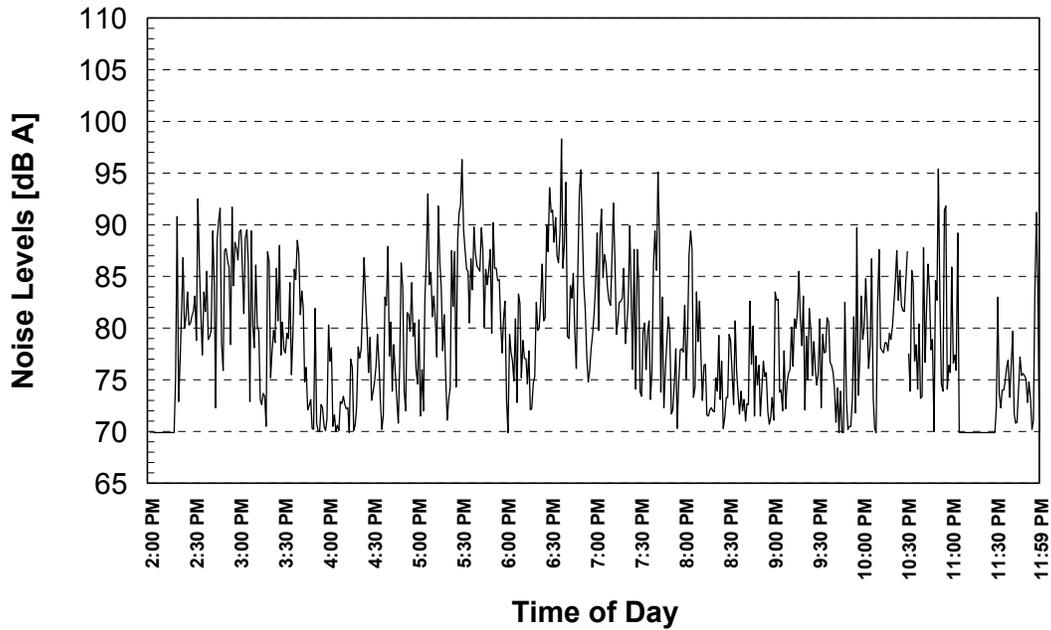
**Figure 39**  
**Noise Dosimeter Data: Trooper 341**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 13, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
5:26 - 5:31 am	Pick Up Dosimeter	8:01 - 8:06 am	Patrol	10:33 - 10:42 am	Patrol
5:31 - 5:49 am	Patrol	8:06 - 8:13 am	Public Assist	10:42 - 10:58 am	Vehicle Stops
5:49 - 6:12 am	Vehicle Stops	8:13 - 8:21 am	Patrol	10:58 - 11:09 am	Patrol
6:12 - 6:19 am	Patrol	8:21 - 8:36 am	Vehicle Stop	11:09 - 11:13 am	Vehicle Stop
6:19 - 6:28 am	Public Assist	8:36 - 8:52 am	Patrol	11:13 - 11:23 am	Patrol
6:28 - 6:30 am	Patrol	8:52 - 9:12 am	Vehicle Stops	11:23 - 11:27 am	Vehicle Stops
6:30 - 6:33 am	Abandoned Vehicle	9:12 - 9:14 am	Patrol	11:27 a - 12:13 p	Patrol
6:33 - 6:38 am	Patrol	9:14 - 9:18 am	Road Hazard Removal	12:13 - 12:16 pm	Public Assist
6:38 - 6:43 am	Vehicle Stops	9:18 - 9:41 am	Patrol	12:16 - 12:38 pm	Patrol
6:43 - 7:00 am	Patrol	9:41 - 9:43 am	Public Assist	12:38 - 1:01 pm	Vehicle Stops
7:00 - 7:11 am	Vehicle Stop	9:43 - 9:59 am	Patrol	1:01 - 1:44 pm	Patrol
7:11 - 7:20 am	Patrol	9:59 - 10:05 am	Vehicle Stop	1:44 - 1:51 pm	Vehicle Stop
7:20 - 7:28 am	Public Assists	10:05 - 10:27 am	Patrol	1:51 - 2:15 pm	Patrol
7:28 - 7:47 am	Patrol	10:27 - 10:33 am	Vehicle Fueling	2:15 - 3:00 pm	Break
7:47 - 8:01 am	Vehicle Stop				

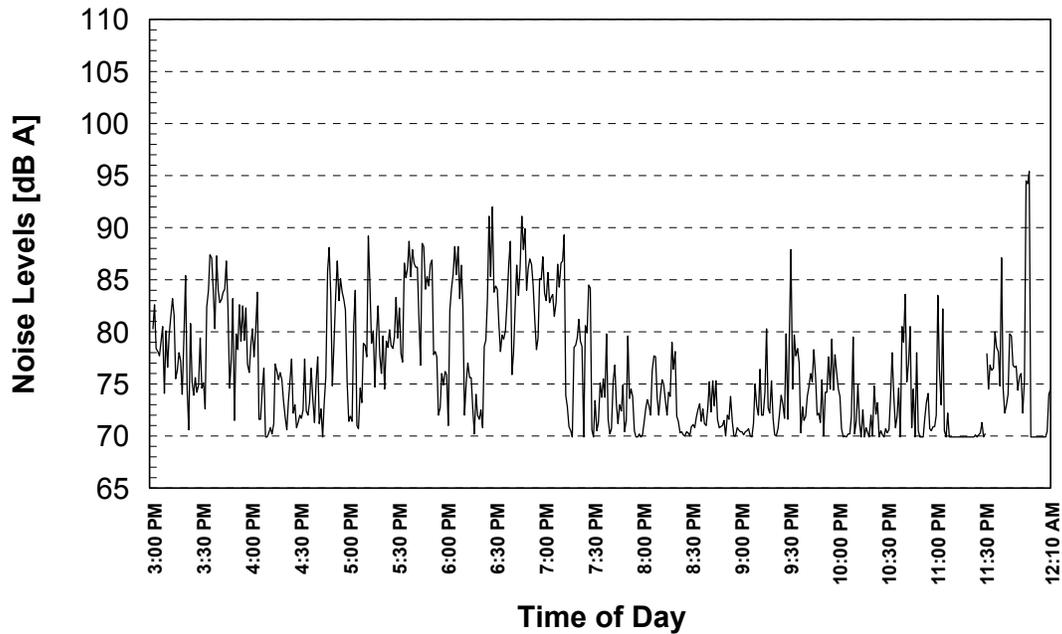
**Figure 40**  
**Noise Dosimeter Data: Trooper 381**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 13, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
2:13 - 2:21 pm	Pick Up Dosimeter	5:44 - 5:47 pm	Patrol	7:44 - 8:13 pm	Patrol
2:21 - 3:13 pm	Patrol	5:47 - 5:53 pm	Public Assist	8:13 - 9:15 pm	Break
3:13 - 3:23 pm	Vehicle Stop	5:53 - 6:01 pm	Patrol	9:15 - 10:07 pm	Patrol
3:23 - 3:34 pm	Patrol	6:01 - 6:07 pm	Vehicle Stop	10:07 - 10:12 pm	Vehicle Stop
3:34 - 3:36 pm	Abandoned Vehicle	6:07 - 6:11 pm	Vehicle Fueling	10:12 - 10:53 pm	Patrol
3:36 - 3:43 pm	Patrol	6:11 - 6:17 pm	Public Assist	10:53 - 10:57 pm	Vehicle Stop
3:43 - 4:01 pm	Supervisor Consult	6:17 - 6:28 pm	Patrol	10:57 - 11:31 pm	Patrol
4:01 - 4:31 pm	Accident Scene	6:28 - 7:26 pm	Accident Scene	11:31 - 11:40 pm	Vehicle Stop
4:31 - 5:37 pm	Patrol	7:26 - 7:37 pm	Patrol	11:40 - 11:52 pm	Patrol
5:37 - 5:44 pm	Vehicle Stop	7:37 - 7:44 pm	Vehicle Stop	11:52 pm	Off Duty

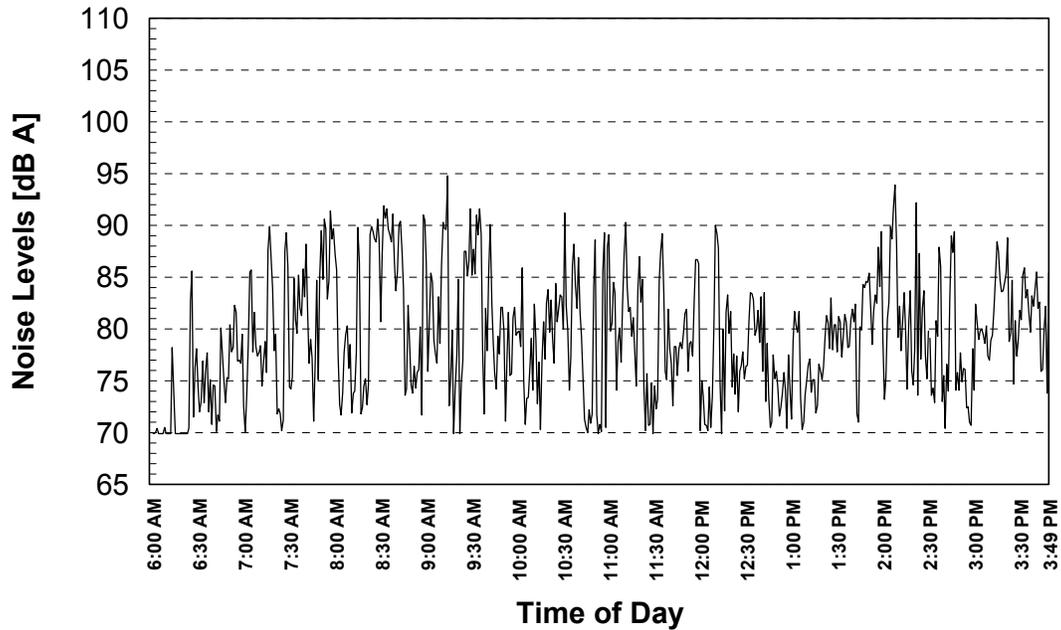
**Figure 41**  
**Noise Dosimeter Data: Trooper 414**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 13-14, 2003**



**UHP - Daily Report**

Time	Activity	Time	Activity	Time	Activity
2:57 - 3:39 pm	Patrol	5:30 - 6:22 pm	Accident Scene	9:14 - 9:36 pm	Patrol
3:39 - 3:45 pm	Vehicle Stop	6:22 - 6:25 pm	Patrol	9:36 - 9:54 pm	Vehicle Fueling
3:45 - 4:30 pm	Patrol	6:25 - 7:13 pm	Accident Scene	9:54 - 10:30 pm	Patrol
4:30 - 4:42 pm	Criminal Incident	7:13 - 7:37 pm	Patrol	10:30 - 11:34 pm	Accident Report
4:42 - 4:49 pm	Patrol	7:37 - 8:10 pm	Accident Follow-up	11:34 p - 12:05 a	Patrol
4:49 - 4:55 pm	Public Assist	8:10 - 8:12 pm	Patrol	12:05 - 12:15 am	Drop Off Dosimeter
4:55 - 5:30 pm	Patrol	8:12 - 9:14 pm	Break		

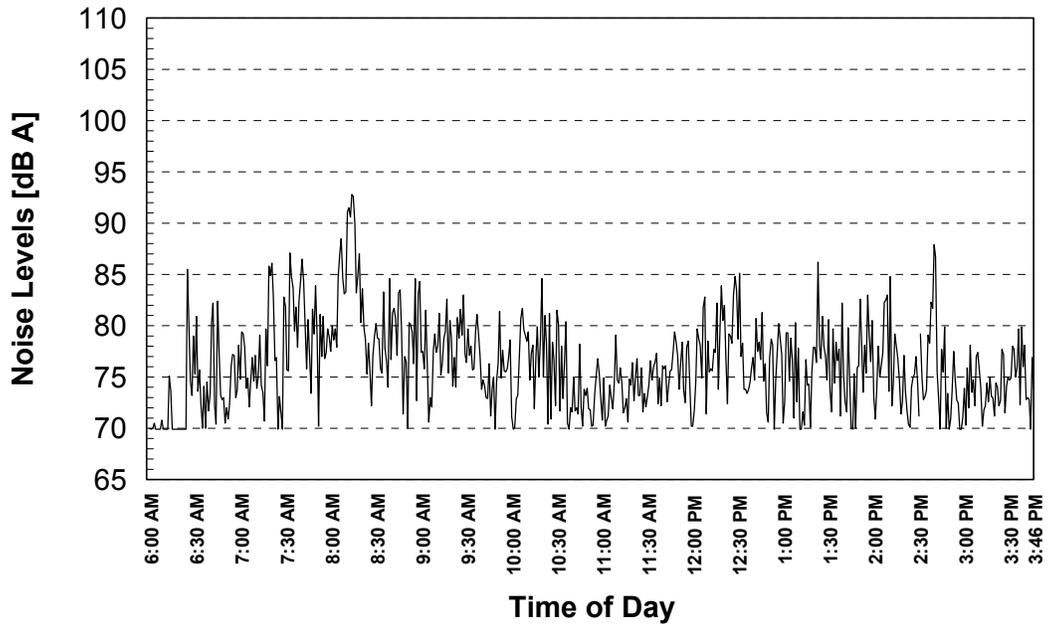
**Figure 42**  
**Noise Dosimeter Data: Trooper 522**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 13, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
6:03 - 6:38 am	Pick Up Dosimeter	9:42 - 9:54 am	Public Assist	12:43 - 1:43 pm	Break
6:38 - 6:50 am	Patrol	9:54 - 10:08 am	Patrol	1:43 - 2:15 pm	Patrol
6:50 - 7:07 am	Accident Scene	10:08 - 10:16 am	Pick Up Laser	2:15 - 2:26 pm	Public Assist
7:07 - 7:17 am	Patrol	10:16 - 10:33 am	Patrol	2:26 - 2:37 pm	Patrol
7:17 - 7:35 am	Vehicle Stop	10:33 - 10:59 am	Vehicle Stop	2:37 - 3:02 pm	Vehicle Stop
7:35 - 7:39 am	Patrol	10:59 - 11:02 am	Assist Local Agency	3:02 - 3:08 pm	Patrol
7:39 - 8:54 am	Accident Scene	11:02 - 11:21 am	Patrol	3:08 - 3:15 pm	Drop Off Laser
8:54 - 8:58 am	Patrol	11:21 - 11:47 am	Vehicle Stop	3:15 - 3:28 pm	Public Assist
8:58 - 9:01 am	Vehicle Stop	11:47 - 11:57 am	Patrol	3:28 - 3:47 pm	Patrol
9:01 - 9:40 am	Accident Scene	11:57 a - 12:18 p	Vehicle Stop	3:47 - 4:07 pm	Drop Off Dosimeter
9:40 - 9:42 am	Patrol	12:18 - 12:43 pm	Patrol		

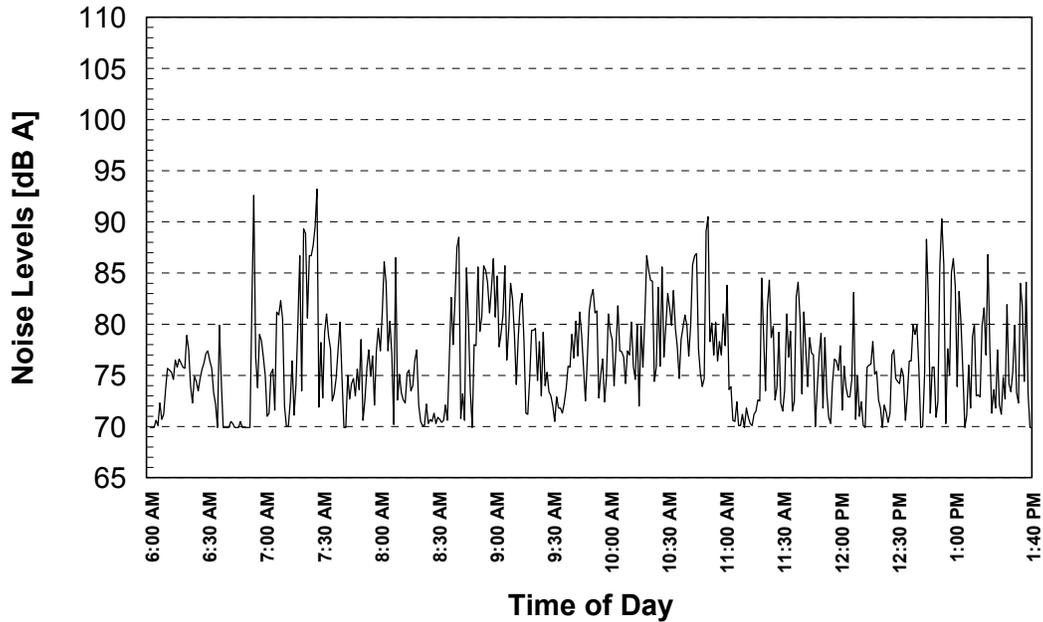
**Figure 43**  
**Noise Dosimeter Data: Trooper 335**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 13, 2003**



**UHP - Daily Report**

REPORT UNAVAILABLE

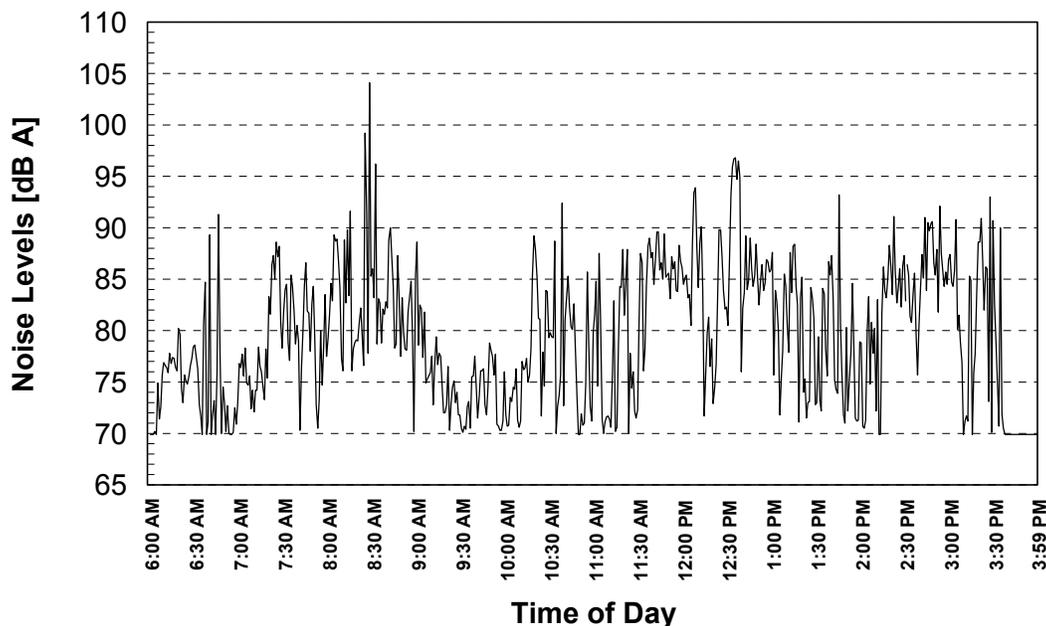
**Figure 44**  
**Noise Dosimeter Data: Trooper 313**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 13, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
6:05 - 7:27 am	Pick Up Dosimeter	8:40 - 8:48 am	Vehicle Stop	11:34 - 11:42 am	Public Assist
7:27 - 7:42 am	Patrol	8:48 - 9:04 am	Patrol	11:42 a - 12:38 p	Patrol
7:42 - 7:49 am	Vehicle Fueling	9:04 - 10:34 am	Break	12:38 - 12:48 pm	Vehicle Stop
7:49 - 8:02 am	Patrol	10:34 - 10:46 am	Patrol	12:48 - 1:35 pm	Patrol
8:02 - 8:09 am	Vehicle Stop	10:46 - 10:52 am	Vehicle Stop	1:35 - 2:24 pm	Drop Off Dosimeter
8:09 - 8:40 am	Patrol	10:52 - 11:34 am	Patrol		

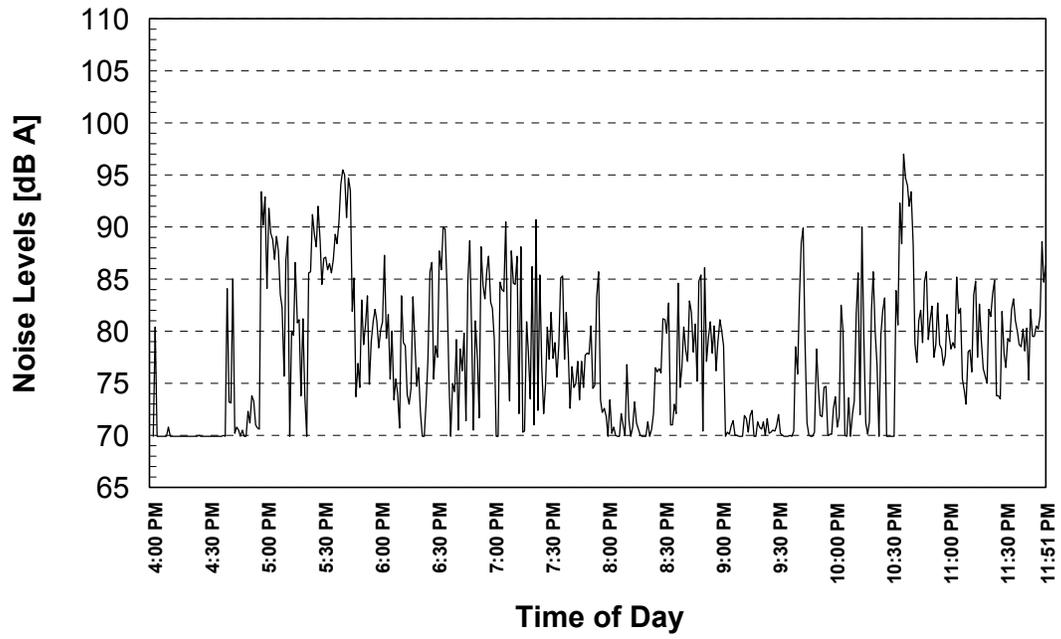
**Figure 45**  
**Noise Dosimeter Data: Trooper 315**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 13, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
6:00 - 6:06 am	Vehicle Fueling	10:35 - 10:48 am	Patrol	1:10 - 1:21 pm	Patrol
6:06 - 6:16 am	Patrol	10:48 - 10:57 am	Vehicle Stop	1:21 - 1:28 pm	County Attorney
6:16 - 7:27 am	Report Other	10:57 - 11:03 am	Patrol	1:28 - 2:07 pm	Patrol
7:27 - 7:35 am	Patrol	11:03 - 11:14 am	Vehicle Stop	2:07 - 2:19 pm	Vehicle Stop
7:35 - 7:47 am	Vehicle Stop	11:14 - 11:23 am	Patrol	2:19 - 2:21 pm	Criminal Incident
7:47 - 7:50 am	Patrol	11:23 - 11:33 am	Vehicle Stop	2:21 - 2:32 pm	Patrol
7:50 - 8:00 am	Vehicle Stop	11:33 - 11:36 am	Patrol	2:32 - 2:52 pm	Vehicle Stop
8:00 - 8:06 am	Patrol	11:36 - 11:45 am	Public Assist	2:52 - 3:05 pm	Patrol
8:06 - 8:32 am	Assist Local Agency	11:45 a - 12:14 p	Patrol	3:05 - 3:16 pm	Vehicle Stop
8:32 - 8:41 am	Patrol	12:14 - 12:28 pm	Vehicle Stop	3:16 - 3:19 pm	Patrol
8:41 - 8:49 am	Vehicle Stop	12:28 - 12:30 pm	Patrol	3:19 - 3:24 pm	Vehicle Stop
8:49 - 9:01 am	Patrol	12:30 - 12:39 pm	Criminal Incident	3:24 - 3:30 pm	Patrol
9:01 - 10:00 am	Break	12:39 - 12:58 pm	Patrol	3:30 - 3:42 pm	Drop Off Dosimeter
10:00 - 10:35 am	Supervisor Consult	12:58 - 1:10 pm	Vehicle Stop		

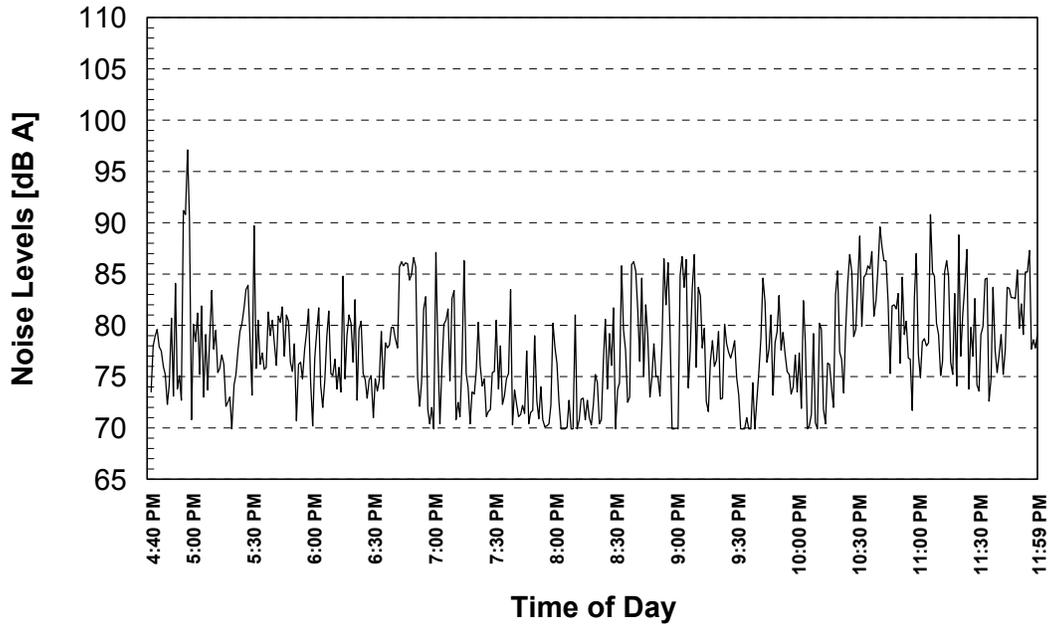
**Figure 46**  
**Noise Dosimeter Data: Salt Lake Co. Trooper**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 13, 2003**



**UHP - Daily Report**

REPORT UNAVAILABLE

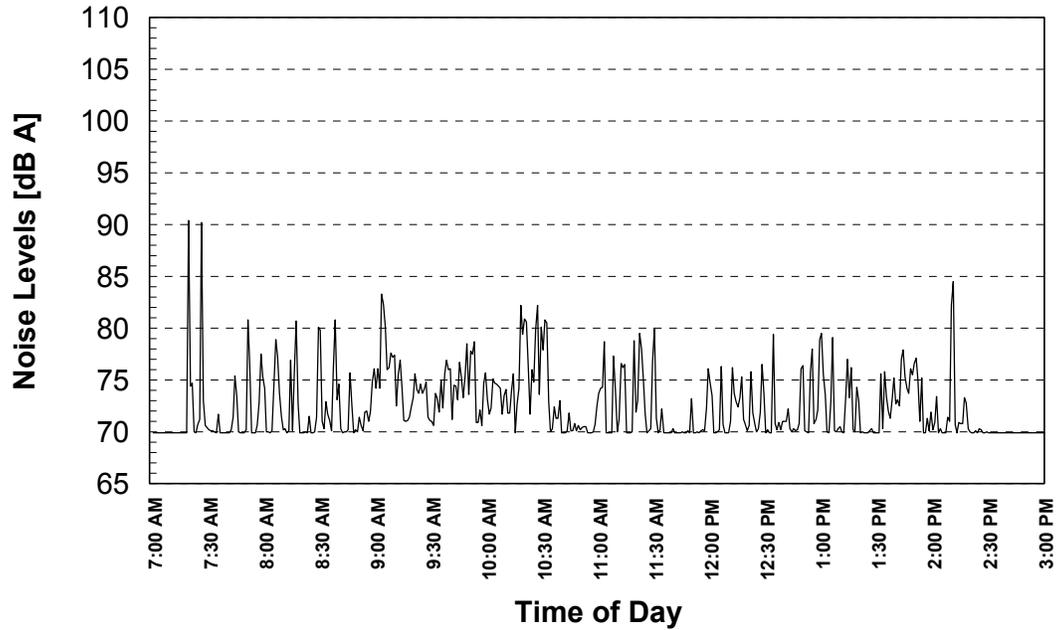
**Figure 47**  
**Noise Dosimeter Data: Trooper 433**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 13, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
4:52 - 5:39 pm	Patrol	6:43 - 6:55 pm	Patrol	8:56 - 9:05 pm	Vehicle Stop
5:39 - 5:48 pm	Vehicle Stop	6:55 - 7:05 pm	Vehicle Stop	9:05 - 9:12 pm	Patrol
5:48 - 5:58 pm	Patrol	7:05 - 7:10 pm	Patrol	9:12 - 9:34 pm	Public Assist
5:58 - 6:05 pm	Vehicle Stop	7:10 - 7:18 pm	Vehicle Stop	9:34 - 9:43 pm	Patrol
6:05 - 6:08 pm	Patrol	7:18 - 7:34 pm	Patrol	9:43 - 9:50 pm	Vehicle Stop
6:08 - 6:12 pm	Public Assists	7:34 - 8:27 pm	Break	9:50 - 9:55 pm	Patrol
6:12 - 6:18 pm	Patrol	8:27 - 8:33 pm	Patrol	9:55 - 10:02 pm	Vehicle Stop
6:18 - 6:27 pm	Vehicle Stop	8:33 - 8:41 pm	Vehicle Stop	10:02 - 10:42 pm	Patrol
6:27 - 6:32 pm	Patrol	8:41 - 8:56 pm	Patrol	10:42 - 11:59 pm	Accident Scene
6:32 - 6:43 pm	Road Hazard Removal				

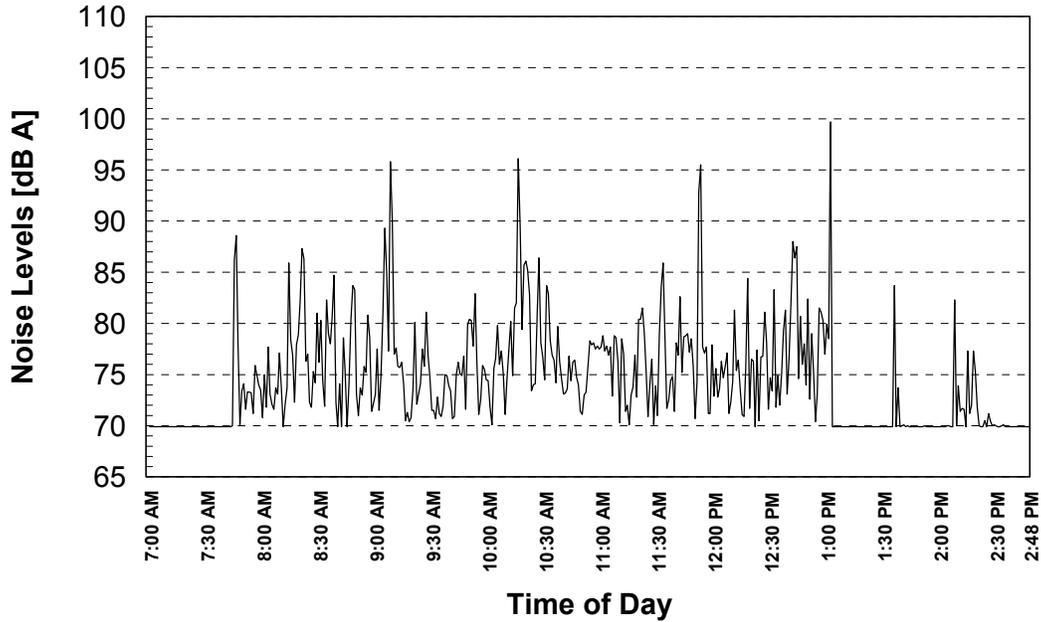
**Figure 48**  
**Noise Dosimeter Data: Trooper 208**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 13, 2003**



**UHP- Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
6:55 - 7:44 am	Patrol	11:14 - 11:41 am	Vehicle Stops	12:57 - 12:59 pm	Patrol
7:44 - 8:25 am	Vehicle Stops	11:41 - 11:59 am	Patrol	12:59 - 1:07 pm	Vehicle Stop
8:25 - 9:01 am	Patrol	11:59 a - 12:09 p	Vehicle Stop	1:07 - 1:14 pm	Patrol
9:01 - 10:00 am	Break	12:09 - 12:12 pm	Patrol	1:14 - 1:21 pm	Vehicle Stop
10:00 - 10:37 am	Patrol	12:12 - 12:26 pm	Vehicle Stop	1:21 - 2:32 pm	Patrol
10:37 - 10:46 am	Vehicle Stop	12:26 - 12:28 pm	Patrol	2:32 - 2:47 pm	Vehicle Fueling
10:46 - 11:01 am	Patrol	12:28 - 12:37 pm	Vehicle Stop	2:47 - 3:00 pm	Patrol
11:01 - 11:11 am	Vehicle Stop	12:37 - 12:49 pm	Patrol	3:00 pm	Off Duty
11:11 - 11:14 am	Patrol	12:49 - 12:57 pm	Vehicle Stop		

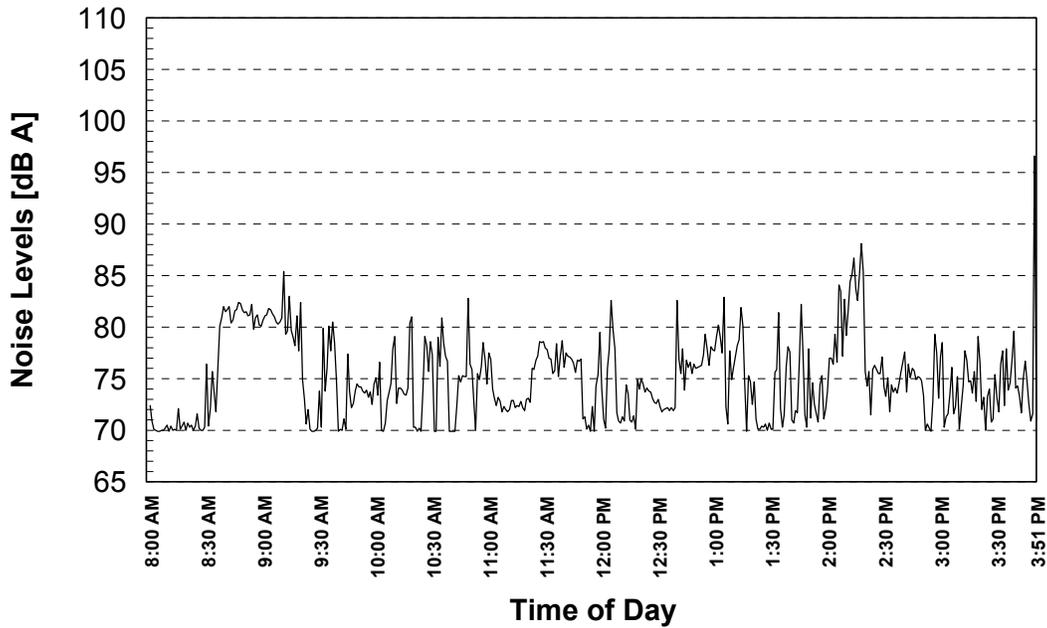
**Figure 49**  
**Noise Dosimeter Data: Trooper 454**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 13, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
6:56 - 8:17 am	Pick Up Dosimeter	9:03 - 10:03 am	Break	11:37 - 11:46 am	Vehicle Stop
8:17 - 8:19 am	Patrol	10:03 - 11:03 am	Patrol	11:46 a - 12:08 p	Patrol
8:19 - 8:23 am	Vehicle Stop	11:03 - 11:13 am	Vehicle Stop	12:08 - 12:40 pm	Vehicle Stops
8:23 - 8:34 am	Patrol	11:13 - 11:19 am	Patrol	12:40 - 12:44 pm	Patrol
8:34 - 8:50 am	Vehicle Stop	11:19 - 11:27 am	Vehicle Stop	12:44 - 12:51 pm	Public Assist
8:50 - 9:03 am	Patrol	11:27 - 11:37 am	Patrol	12:51 - 1:33 pm	Drop Off Dosimeter

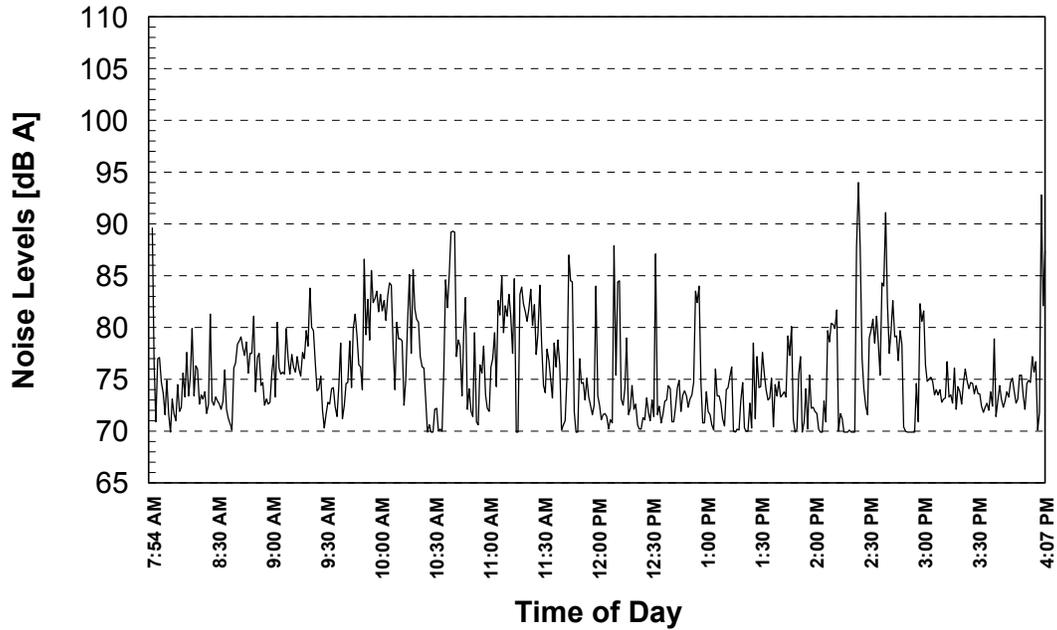
**Figure 50**  
**Noise Dosimeter Data: Trooper 410**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 13, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
7:45 - 8:35 am	Report Other	10:38 - 10:45 am	Vehicle Stop	12:42 - 12:46 pm	Vehicle Stop
8:35 - 10:00 am	Patrol	10:45 - 10:51 am	Patrol	12:46 - 1:34 pm	Patrol
10:00 - 10:07 am	Vehicle Stop	10:51 - 10:56 am	Vehicle Stop	1:34 - 1:37 pm	Vehicle Stop
10:07 - 10:18 am	Patrol	10:56 - 11:59 am	Patrol	1:37 - 1:47 pm	Patrol
10:18 - 10:27 am	Vehicle Stop	11:59 a - 12:07 p	Vehicle Stop	1:47 - 1:52 pm	Vehicle Stop
10:27 - 10:29 am	Patrol	12:07 - 12:14 pm	Patrol	1:52 - 2:07 pm	Patrol
10:29 - 10:34 am	Vehicle Stop	12:14 - 12:21 pm	Vehicle Stop	2:07 - 2:11 pm	Vehicle Stop
10:34 - 10:38 am	Patrol	12:21 - 12:42 pm	Patrol	2:11 - 4:03 pm	Patrol

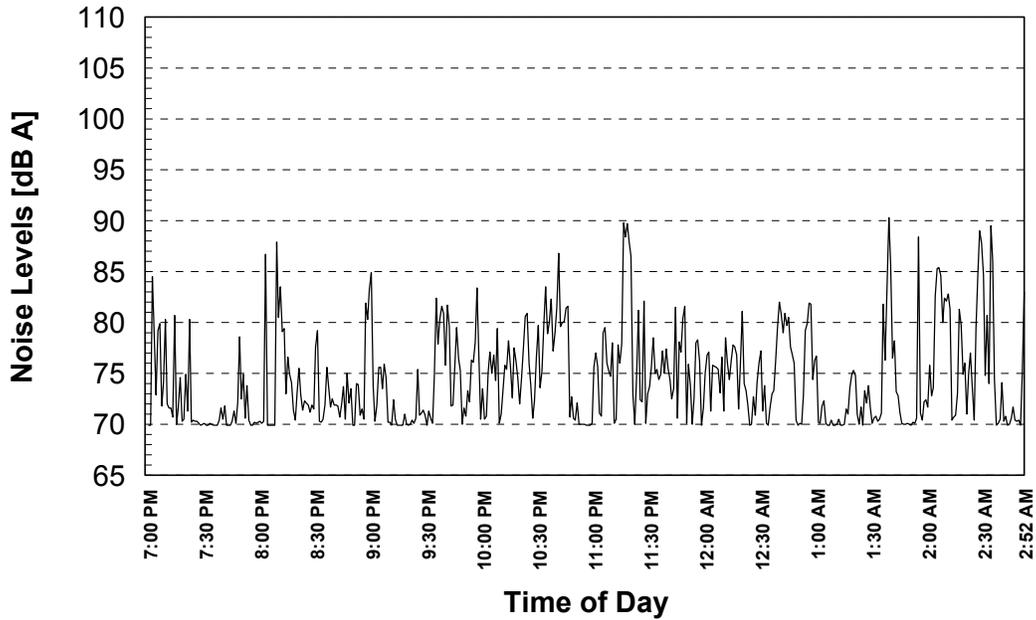
**Figure 51**  
**Noise Dosimeter Data: Trooper 188**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 13, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
7:00 - 8:30 am	Travel	10:35 - 11:12 am	Patrol	1:42 - 1:50 pm	Vehicle Stop
8:30 - 9:22 am	Drivers License Hearing	11:12 - 11:47 am	Vehicle Stop	1:50 - 2:45 pm	Patrol
9:22 - 9:38 am	Patrol	11:47 a - 12:54 p	Break	2:45 - 3:00 pm	Vehicle Stop
9:38 - 10:35 am	Vehicle Stop	12:54 - 1:42 pm	Patrol	3:00 5:00 pm	Travel

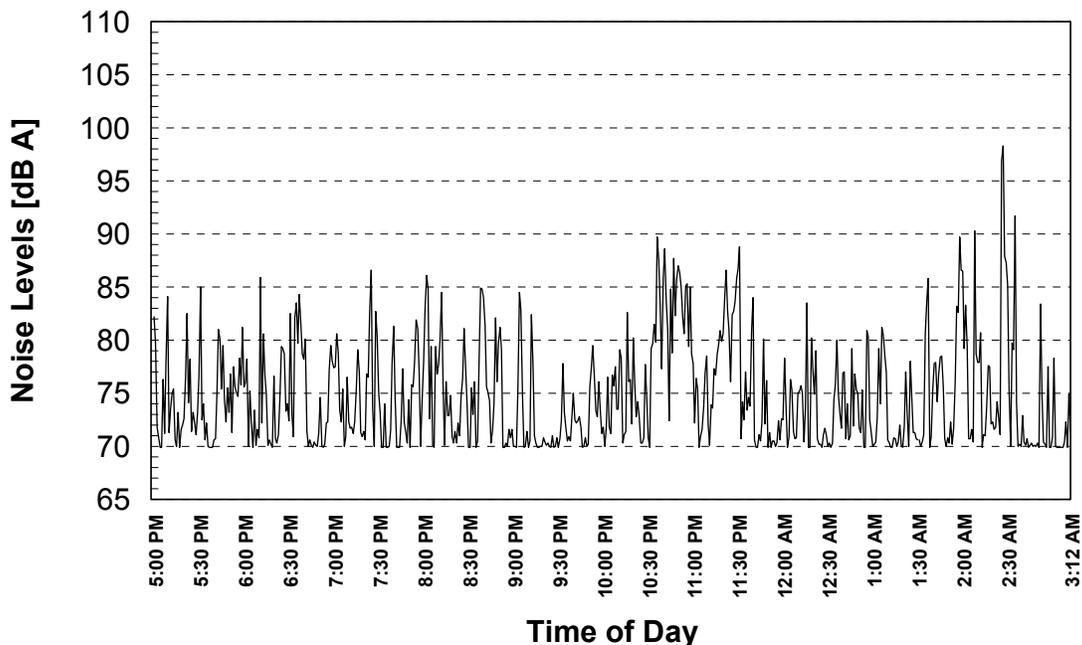
**Figure 52**  
**Noise Dosimeter Data: Trooper 416**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 13-14, 2003**



**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
7:00 - 7:15 pm	Pick Up Dosimeter	9:56 - 10:00 pm	Vehicle Stop	10:39 - 11:45 pm	Patrol
7:15 - 7:24 pm	Patrol	10:00 - 10:05 pm	Patrol	11:45 p - 2:03 a	DUI Arrest
7:24 - 8:34 pm	Incident Report	10:05 - 10:08 pm	Vehicle Stop	2:03 - 2:05 am	Patrol
8:34 - 9:30 pm	Report Other	10:08 - 10:13 pm	Patrol	2:05 - 2:25 am	DUI Arrest
9:30 - 9:45 pm	Patrol	10:13 - 10:27 pm	Vehicle Stop	2:25 - 2:52 am	Patrol
9:45 - 9:53 pm	Vehicle Stop	10:27 - 10:32 pm	Patrol	2:52 am	Off Duty
9:53 - 9:56 pm	Patrol	10:32 - 10:39 pm	Vehicle Stop		

**Figure 53**  
**Noise Dosimeter Data: Trooper 317**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 13-14, 2003**

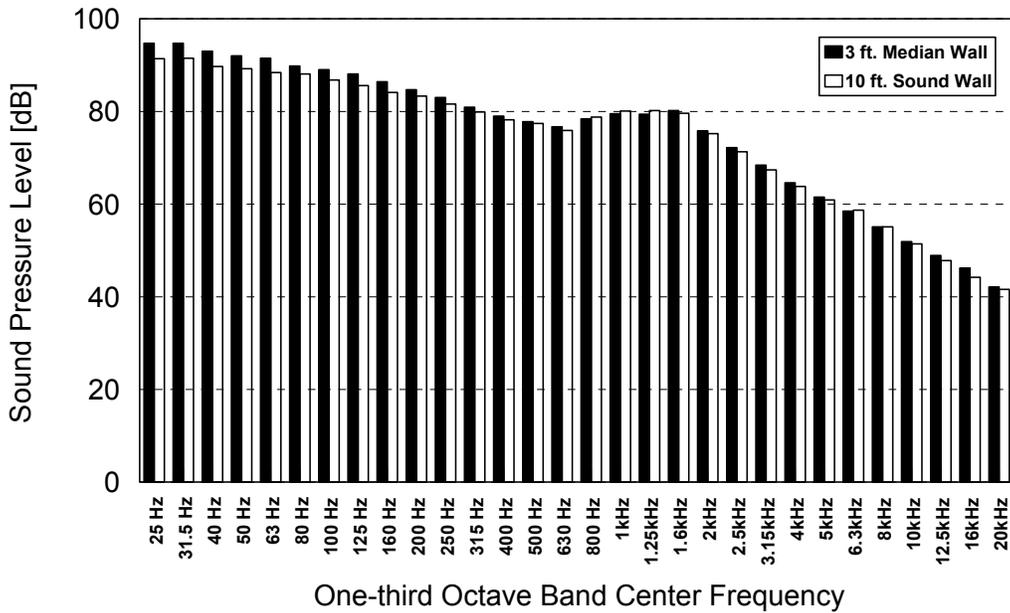
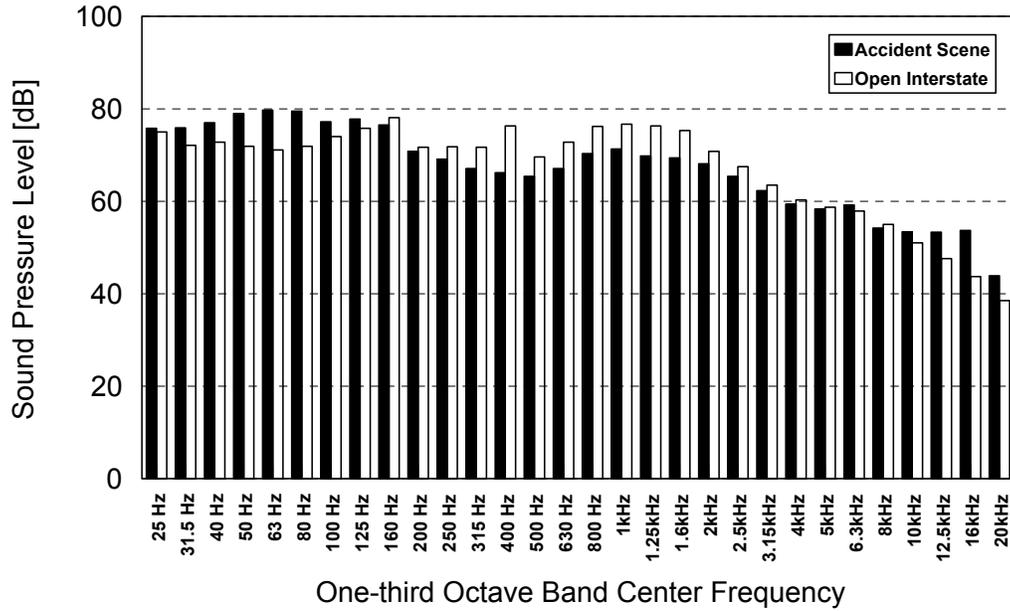


**UHP - Daily Report**

<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>	<b>Time</b>	<b>Activity</b>
4:42 - 5:53 pm	Patrol	8:37 - 8:52 pm	Vehicle Stop	12:10 - 12:37 am	Vehicle Stops
5:43 - 6:00 pm	Accident Scene	8:52 - 9:03 pm	Patrol	12:37 - 12:49 am	Criminal Incident
6:00 - 6:55 pm	Patrol	9:03 - 9:15 pm	Vehicle Stop	12:49 - 12:53 am	Patrol
6:55 - 7:20 pm	Report Other	9:15 - 10:09 pm	Patrol	12:53 - 12:57 am	Vehicle Stop
7:20 - 7:22 pm	Patrol	10:09 - 10:21 pm	Criminal Incident	12:57 - 1:03 am	Patrol
7:22 - 7:32 pm	Vehicle Stop	10:21 - 10:35 pm	Patrol	1:03 - 1:11 am	Vehicle Stop
7:32 - 7:41 pm	Patrol	10:35 - 11:06 pm	Accident Scene	1:11 - 1:21 am	Patrol
7:41 - 7:49 pm	Vehicle Stop	11:06 - 11:47 pm	Patrol	1:21 - 1:26 am	Vehicle Stops
7:49 - 7:54 pm	Patrol	11:47 - 11:59 pm	Vehicle Stop	1:26 - 1:55 am	Patrol
7:54 - 8:06 pm	Vehicle Stop	11:59 p - 12:02 a	Criminal Incident	1:55 - 2:53 am	DUI Arrest
8:06 - 8:10 pm	Patrol	12:02 - 12:05 am	Patrol	2:53 - 3:12 am	Patrol
8:10 - 8:19 pm	Vehicle Stops	12:05 - 12:07 am	Vehicle Stop	3:12 am	Off Duty
8:19 - 8:37 pm	Patrol	12:07 - 12:10 am	Patrol		

**Figure 54**

**Spectral Noise Data from Freeway Locations**  
**Utah Highway Patrol**  
**HETA 2003-0094**  
**March 11-13, 2003**



DEPARTMENT OF HEALTH AND HUMAN SERVICES  
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